Dissertation on

"ASSESSMENT OF MYOCARDIAL STATUS IN CRITICALLY ILL CHILDREN IN PICU - A PROSPECTIVE OBSERVATIONAL STUDY"

Submitted in partial fulfillment for the Degree of

M.D PAEDIATRICS

BRANCH – VII

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INSTITUTE OF SOCIAL PAEDIATRICS

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CERTIFICATE BY THE INSTITUTION

This is to certify that the dissertation entitled **"ASSESSMENT OF MYOCARDIAL STATUS IN CRITICALLY ILL CHILDREN IN PICU - A PROSPECTIVE OBSERVATIONAL STUDY"** is a bonafide record of work carried out by **DR.SHARMILA.V,** in the Department of Paediatrics, Government Stanley Medical College, under our direct supervision and guidance and supervision during the academic year 2016-2018 submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the requirement of the award for the degree of **M.D. PAEDIATRICS, BRANCH VII.**

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I hereby declare that this dissertation/thesis entitled **"ASSESSMENT OF MYOCARDIAL STATUS IN CRITICALLY ILL CHILDREN IN PICU - A PROSPECTIVE OBSERVATIONAL STUDY"** is a bonafide and genuine research work carried by me, **DR.SHARMILA .V** under the guidance of **PROF. D.ANURADHA MD., DCH,** Professor in Department of Pediatrics, Institute of Social Pediatrics, Stanley Medical College.

The dissertation is submitted to **THE TAMILNADU MGR MEDICAL UNIVERSITY** towards partial fulfillment of the rules and regulations for the **MD DEGREE EXAMINATION-BRANCH VII** in Pediatrics.

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Introduction

INTRODUCTION

Acute Severe Myocardial Dysfunction Contributes A Significant Cause Of Mortality And Morbidity In Critically Ill Children Admitted In Picu. Severity assessment of illness and outcome in critically ill children is important as it influences management strategies and resource allocation. This Prospective Study Aims To Evaluate Myocardial Status In Critically Ill Children Admitted In Picu Using CARDIAC TROPONIN T cTnT Levels As Early Determinant Of Myocardial Injury along with ECHO,ECG As Diagnostic Tools.

In Picu Admitted Children There Are Physiological Stresses In Form Of Sepsis, Hypoxia Resulting In Cardiac Dysfunction, Injury And Also Both. This Injury Is contributed by increased myocardial oxygen demands and decreased myocardial oxygen supply. ECG is very much important for this study as it shows myocardial ischemia and shows ECG patterns of T wave inversion, ST elevation, Prominence of Q wave, R wave reduction due to necrosis. TROPONIN T was measured at admission while drawing routine blood samples in PICU. On the same day of admission echocardiogram was performed bedside by Paediatric cardiologist. ECHO determines LVEF-left ventricular ejection fraction, systolic fraction shortening, Dilated Cardiomyopathy, Thinned out Ventricles, ventricular

dysfunction. CHEST XRAY was taken bedside .CXR contributes valuable information on Heart and Lung pathology.

The aim of our study was to evaluate myocardial status in critically ill children admitted in PICU and to assess the relation between CARDIAC TROPONIN T cTnT levels and disease severity and duration of PICU stay, mortality with myocardial dysfunction measured by ECHOCARDIOGRAPHY.

MYOCARDIAL INJURY

PATHOPHYSIOLOGY

The myocardium may be affected in several ways in critically ill children in PICU. There is disparity between myocardial oxygen demand and supply. Myocardial ischemia, myocyte death may occur directly due to stress factors imposed on heart due to several non-cardiac etiology such as Hypoxia, shock, sepsis, Acute kidney injury, MODS, electrolyte abnormalities, hypovolemia, anemia, hypertension, post surgery, drugs, toxins released due to viral and other underlying infections. Second phase there is direct myocyte death due to direct effects and also activation of innate immune response which contributes to further myocardial damage.Third phase the antibodies released by viral specific responses continue to damage myocardium resulting in dilated cardiomyopathy in a genetically predisposed individual.myocardial damage results in contractile

dysfunction and ventricular dilatation.papillary muscle dysfunction can cause valvular regurgitation. pericardial effusion can also occur.

CARDIAC FINDINGS IN CRITICALLY ILL CHILDREN

MYOCARDIAL ISCHEMIA:

Myocardial ischemia is caused by decreased oxygen supply-“primary ischemia” or increased demand-“secondary ischemia” or a combination of two-“combined ischemia”. The sum of all may result in a cascade of events constitutes the total ischemic burden. This directly reflects in systolic dysfunction resulting in fall in “LVEF”. TROPONIN-T levels are elevated representing myocardial damage. ECG shows ST Depression and T Wave Inversion. Echocardiogram shows decreased left ventricular contraction or fractional shortening.

DILATED CARDIOMYOPATHY

Dilated cardiomyopathy characterised by cardiac dilatation, diminished cardiac contractility, congestive cardiac failure. It is also characterised by fractional shortening, LVEF decrease and mitral and tricuspid valve regurgitation. Despite of fall in LVEF cardiac output is maintained by tachycardia. Tachycardia of any etiology increases myocardial oxygen demand owing to reduced filling time, reducing the coronary perfusion. pulmonary edema may develop and cardiac output gets diminished. Myocarditis can present in acute or chronic manner. Chronic

myocardial damage in form of ongoing myocarditis, accelerated coronary artery disease, cachexia, drug toxicity all can contribute to dilated cardiomyopathy.

Anemia, viral or any infections, hypoxia, ischemia, acidosis, hypercarbia, hyperthermia, hypocalcemia contributes to myocardial dysfunction. Treatment consists of correction of co-existent metabolic abnormalities, supporting of myocardium with intravenous fluids and ionotropic agents like Dopamine, Dobutamine, adrenaline, milrinone.

CARDIAC DYSRHYTHMIAS

Tachycardia, ventricular fibrillation, bradycardia, sinus node arrest manifestations are found in critically ill children.

PERICARDIAL EFFUSION

Pericardial effusion is commonly seen in HIV patients, Hypothyroidism, Autoimmune diseases, chronic kidney disease, Kaposi sarcoma. Bacterial, viral, fungal infections also cause pericarditis. Clinically children may present with dyspnoea or chest pain. There is muffling of heart sounds on auscultation. CXR shows flask shaped heart. ECG shows low voltage QRS complexes. Echocardiography detects pericardial effusion. Large pericardial effusion with cardiac tamponade can also occur in mycobacterium infection.

PULMONARY HYPERTENSION

Pulmonary hypertension can occur in HIV, chronic kidney disease, Recurrent pneumonia, sickle cell disease, autoimmune disorder, vasculitis. Right heart failure secondary to severe pulmonary hypertension is also a possibility. Right ventricular function should be assessed with modalities such as tissue Doppler echocardiography and tricuspid regurgitation mapping.

MITRAL REGURGITATION, TRICUSPID REGURGITATION-VALVULAR INVOLVEMENT

Mitral regurgitation, tricuspid regurgitation can occur in Dilated cardiomyopathy. Valvular involvement is confirmed with echocardiogram. Myocardial damage results in myocardial dysfunction. Ventricular dilatation, papillary muscle dysfunction can cause valvular regurgitation.

2D ECHOCARDIOGRAPHY - identifies the pattern of valvular involvement. Colour Doppler imaging assesses regurgitation or stenosis.Spectral Doppler to assess gradient across cardiac valves.Non bacterial thrombotic endocarditis can occur in SLE,HIV.

RESTRICTIVE CARDIOMYOPATHY

Myocardial fibrosis, endocardial fibrosis leads to restrictive cardiomyopathy. It is observed in children on anticancer drugs

VENTRICULAR HYPERTROPHY

- Left ventricular hypertrophy from systemic hypertension
- Right ventricular hypertrophy from pulmonary hypertension
- Left ventricular hypertrophy occurs in chronic kidney disease due to volume overload and pressure overload. left ventricular hypertrophy is also observed in Metabolic syndrome, HIV children

CORONARY ARTERY INVOLVEMENT

Children can be affected with early coronary artery disease in HIV, Metabolic syndrome, Vasculitis in ECHO-regional wall motion abnormalities should be assessed for accelerated coronary artery disease.

LARGE VESSEL ARTERIOPATHY

Arteriopathy of aorta and pulmonary arteries observed in HIV children. Characterised by medial hypertrophy and chronic inflammation and stenosis of vessels

INTRACARDIAC MASSES

Kaposi sarcoma, non-hodgkin lymphoma are malignancies that primarily involve myocardium or pericardium. Secondary metastasis to heart is rare.

CONGESTIVE CARDIAC FAILURE

Myocardial ischemia, myocyte death leads to primary myocardial dysfunction contributes to congestive cardiac failure

CARDIAC TROPONIN

Cardiac troponin T and I are regulatory proteins found on the contractile apparatus of striated muscle that controls calcium mediated interaction of actin and myosin. Specific forms of troponin subunits T,C,I exist in different muscle types. Since troponins do not occur in extracellular space their appearance in serum is sensitive and specific marker of myocardial damage. Cardiac troponin starts rising in the serum 2-4 hours after myocardial injury, peaks at 48 hours and remains elevated for 7-10 days. Normal values of troponin 0 to 0.097 microgram / L.cardiac specific troponins have T and I have become established as gold standard biochemical markers for myocardial necrosis .elevated troponin is a common finding in critically ill patients in ICU. Frequent conditions causing troponin elevation include hypovolemia, sepsis, heart failure, demand ischemia, tachycardia, heart failure, myocarditis, myocardial contusion, COPD, pulmonary hypertension, pulmonary embolus and renal failure.

Ammann and colleagues reported in 85% of 20 ICU patients with sepsis had elevated troponin levels 59% had no underlying coronary artery disease.

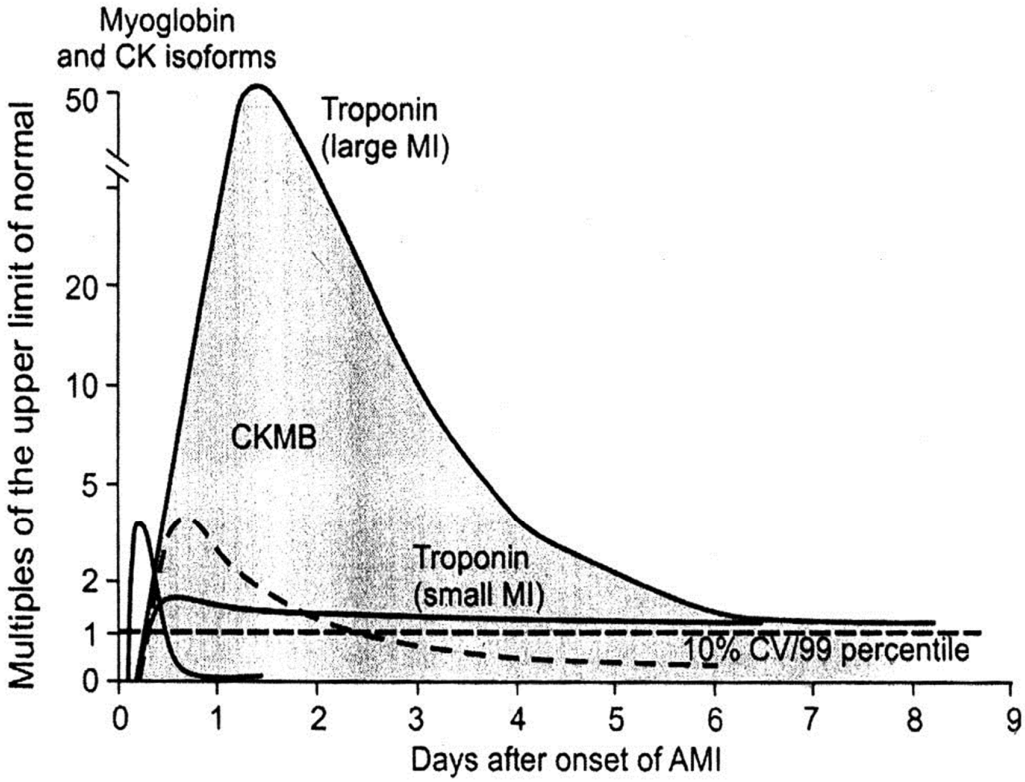
Bakshi and colleagues showed tachycardia, demand ischemia, tachyarrythmia, pericarditis, strenuous exercise, ccf, supraventricular tachycardia cause elevated troponin T levels in ICU.

Hamwi and colleagues reported in 74 patients without no evidence of myocardial ischemia, LVH patients had raised troponin T levels

Ramappa and colleagues showed higher mortality in subarachnoid hemorrhage patients with elevated troponin T levels.

Brunet and colleagues 27% of raised troponin T in chronic kidney disease patients on hemodialysis.

Hsu and colleagues increase in mortality rate in elevated troponin T patients with right ventricular hypertrophy



Elevation of enzymes after myocardial infarction

ECHOCARDIOGRAPHY

Echocardiography is a major non-invasive cardiac investigation first demonstrated by edler. The frequency of ultrasound waves is greater than that appreciated by human ears(18-20 kilohertz)

Ultrasound are generated by materials that have piezoelectric effect. They have the ability to emit sound waves and receive them to generate a potential. The sound source of a transducer is a circular lead zirconate titanate crystal that ranges from 6-13 mm in diameter. The transducer is activated to about 3000 times/sec to emit ultrasound pulses.

The sound waves are reflected when it encounters a boundary between two materials of different physical properties such as blood, endocardium.

Types of echocardiogram:

There are three methods of echocardiogram

1. M - Mode
2. Two Dimensional (2-D) or Cross Sectional
3. Doppler - Continuous Wave, Pulsed Wave and Colour Flow.

\

M MODE (Motion mode)

- High sensitivity of moving structures

- Useful in valve motion, measurement of the size and thickness of cardiac chambers.

Two Dimensional 2 D or Cross Sectional

a) Parasternal view

b) Apical four chamber view

c) Subcostal view

d) Suprasternal view

DOPPLER ECHO

Gives hemodynamic information regarding heart and blood vessels.it can be used to measure severity of valvular narrowing(stenosis),valvular leakage (regurgitation) and shunts like VSD,ASD

Summary of Echo Modalities and their main uses

2-D Echo	Anatomy, Ventricular and valvular movements, positioning for M Mode and Doppler Echo.
M-mode Echo	Measurement of dimensions, timing of cardiac events.
Pulsed Wave Doppler	Normal valve flow patterns, LV diastolic function, stroke volume and cardiac output
Continuous wave	Severity of valvular stenosis, severity of valvular lesions
Doppler	Regurgitation Velocity of flow in shunts
Colour flow mapping	Assessment of regurgitation and shunts

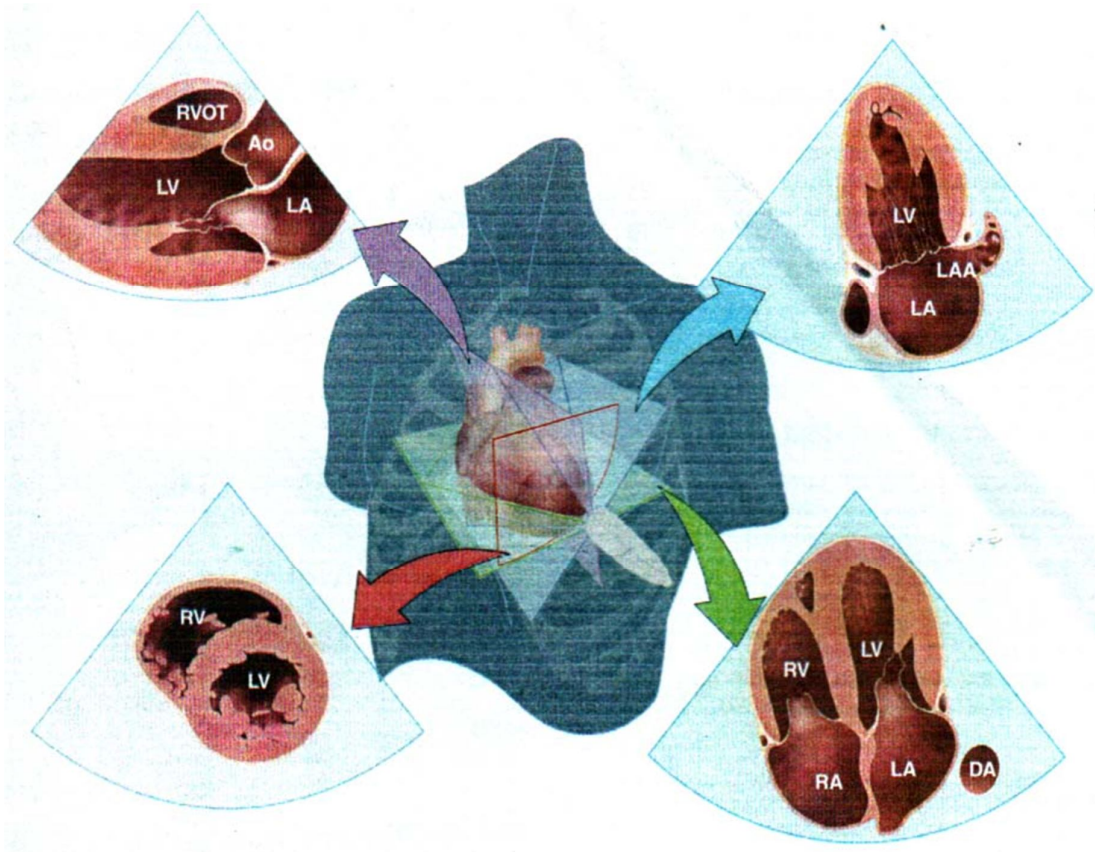
Usefulness of Normal Echo

Echo provides a great deal of anatomical and haemodynamic information:

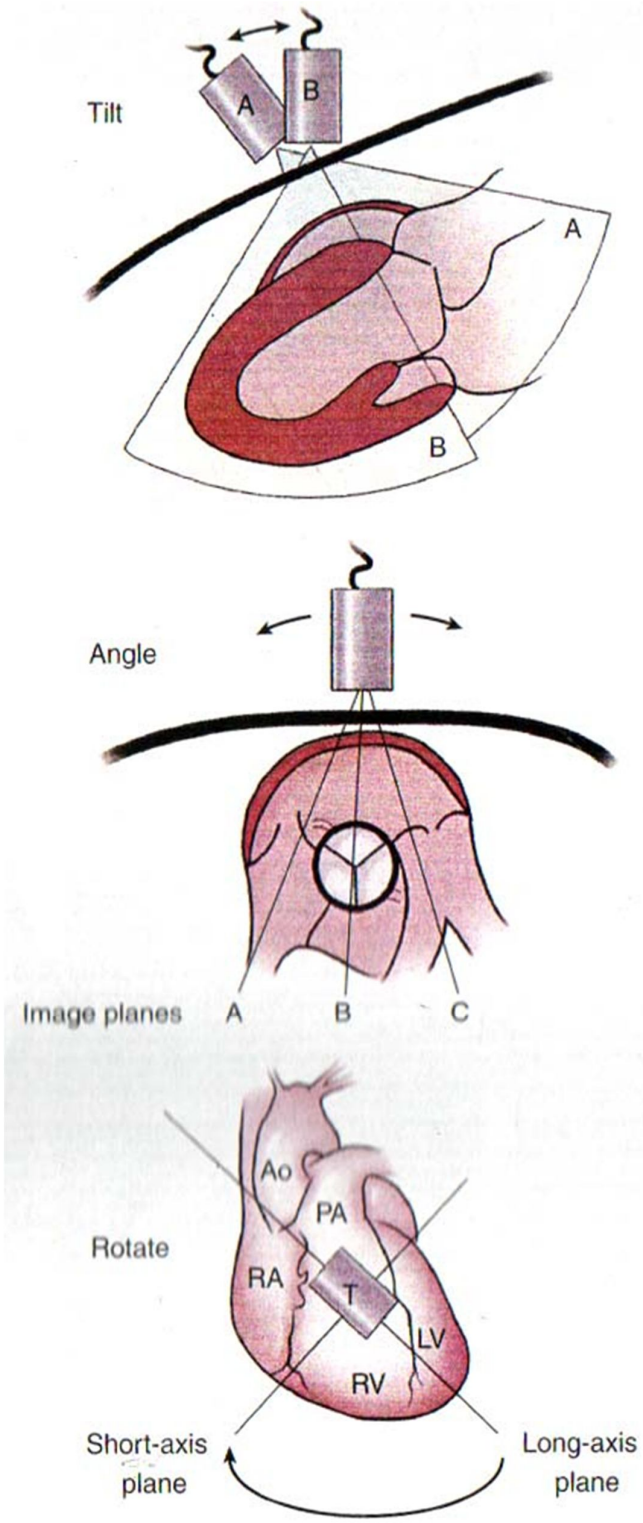
- Heart chamber size
- Chamber function (systolic and diastolic)
- Valvular motion and function
- Intracardiac and extracardiac masses and fluid collections
- Directing blood flow and haemodynamic information

Objective	**Method**
Assess pericardial effusion	2D echocardiography
Systolic and diastolic function	Measure left ventricular ejection fraction or fractional shortening Calculate myocardial performance index Tissue Doppler interrogation of mitral and tricuspid valve annuli Pulsed-wave Doppler interrogation of pulmonary veins and mitral inflow Measure tricuspid annulus plane systolic excursion Quantify global ventricular systolic function by deformation imaging Quantify regional wall motion abnormality by deformation imaging
Assess for endocardial disease Non-bacteria thrombotic (verrucous, Libman-Sacks) endocarditis Valve predilection: mitral >aortic >tricuspid > pulmonary Mural endocarditis Rheumatoid nodules in rheumatoid arthritis	2D echocardiography

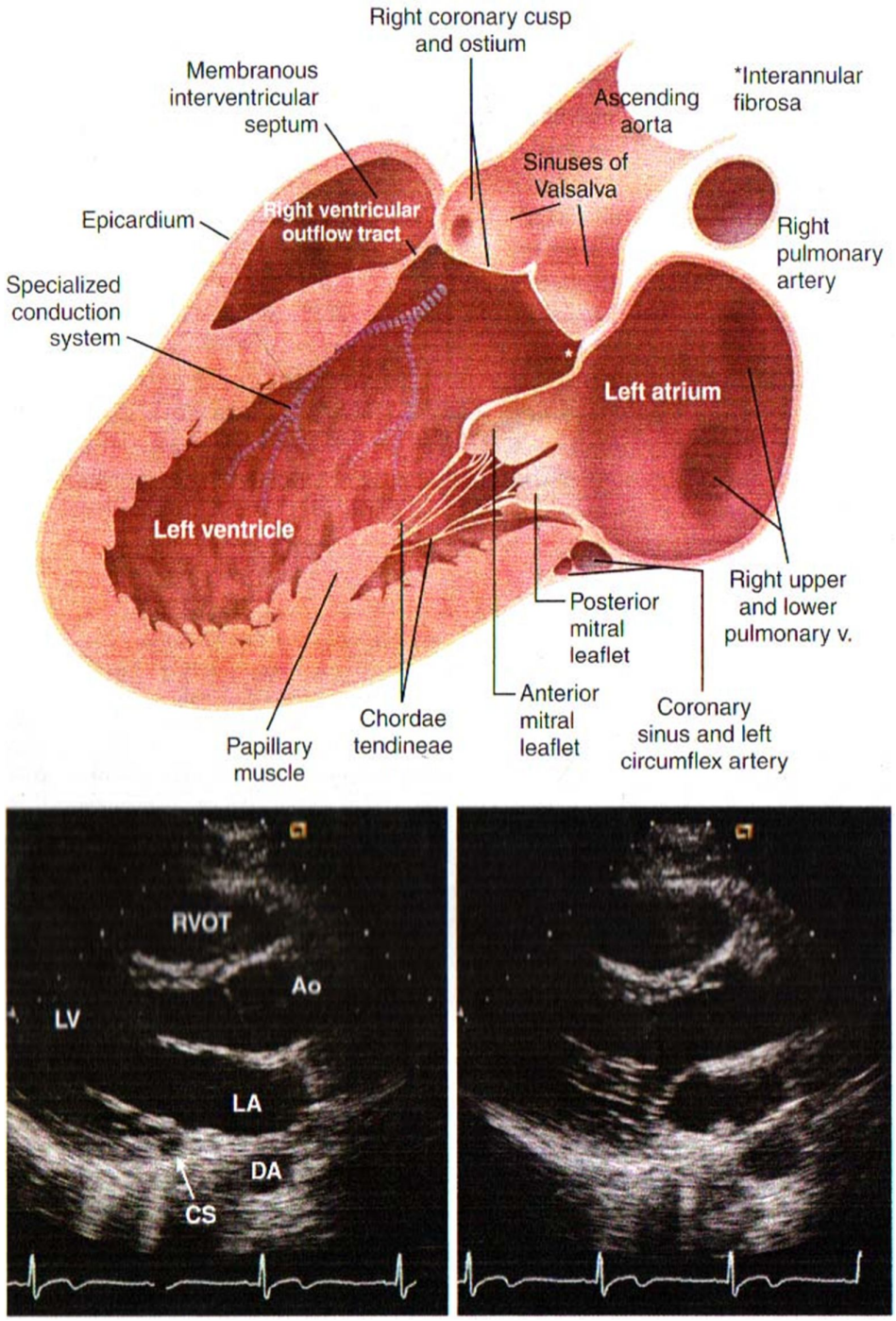
Assess hemodynamic characteristics Pulmonary hypertension	Estimate right ventricular systolic pressure by Doppler interrogation of tricuspid regurgitation
Assess secondary effects on heart Left ventricular hypertrophy from systemic hypertension Right ventricular hypertrophy from pulmonary hypertension	Assess diastolic function of the ventricles Measure left ventricular septal and posterior wall thickness Calculate left ventricular mass



The four basic image planes used in transthoracic echocardiography. Four chamber view includes both ventricles and both atria.



Transducer motion for echocardiography in left parasternal transducer position.



Normal parasternal long-axis 2D echo images at end-diastole left and end-systole.

ECG CHANGES

ECG is an important investigation to diagnose the various diseases affecting the cardiovascular system.

Classification of Leads

The leads are broadly classified into frontal plane and horizontal leads.

1) Frontal plane leads : L1, LII, LIII, aVR, aVL, aVF
2) Horizontal leads : V_1, V_2, V_3, V_4, V_5, V_6

Leads are also classified into bipolar leads (LI, LII and LIII) and unipolar leads (aVR, aVL, aVF, chest leads V_1 to V_6 and oesophageal leads)

Analysis

Analysis of the ECG consists of :

1. Identification of position of the heart
2. Rhythm
3. Rate
4. P wave abnormalities
5. Identification of axis, and
6. Ventricular hypertrophic pattern

ECG changes in Myocardial Infarction

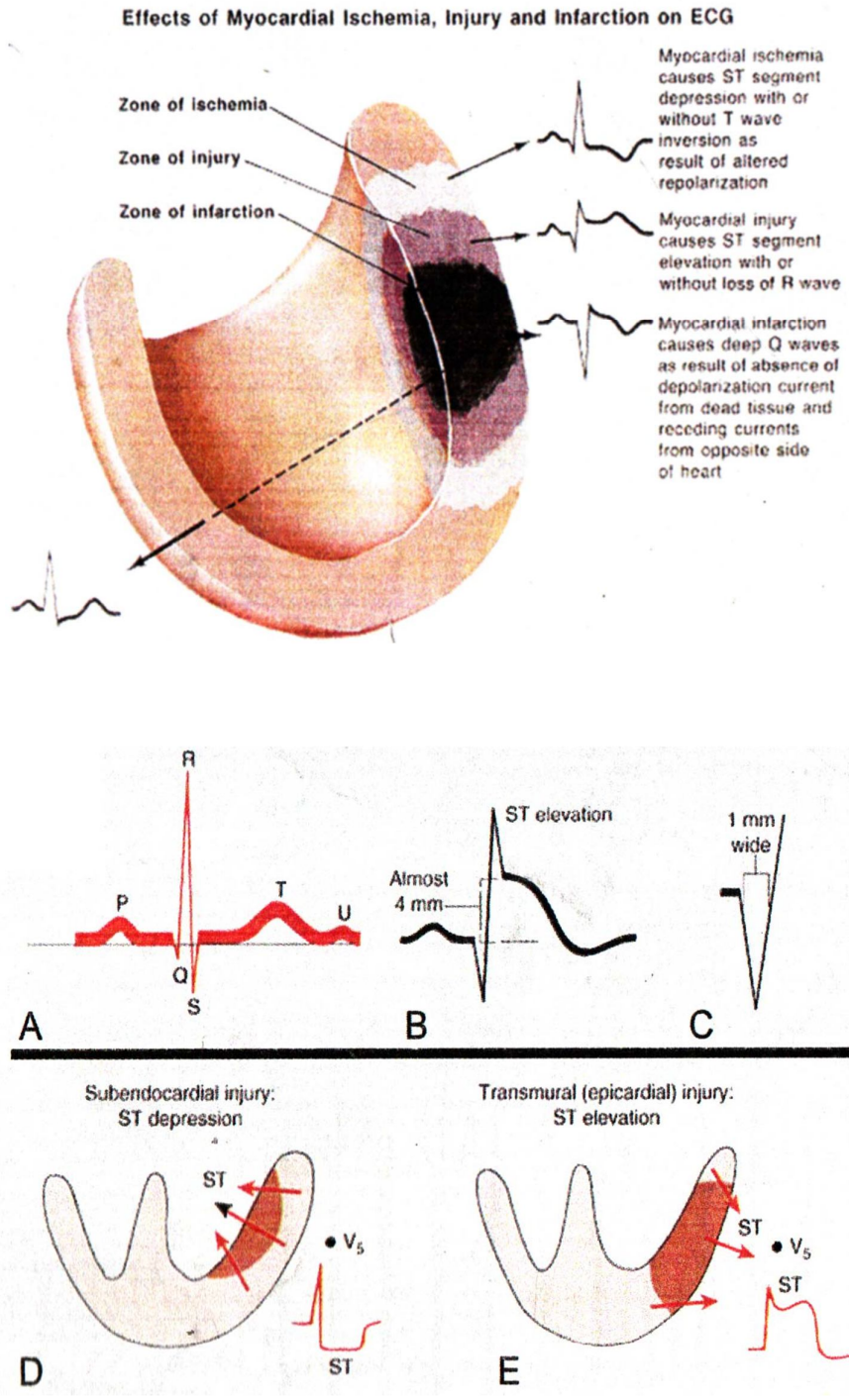
The infarct is pyramid shaped with a broad base towards the endocardium. It also shows the necrosis, injury and ischaemia are in quotation marks. The broad ECG changes are as follows:

1. Prominence of the Q wave
2. Reduction of 'R' wave due to necrosis
3. ST segment elevation and T wave inversion

Ischaemia : The early changes are ST segment depression and symmetrical T-wave inversion.

Injury : ST segment elevation with convexity upwards.

Necrosis: Q wave appears with ST segment elevation and T wave inversion seen. The amplitude of R wave is decreased.



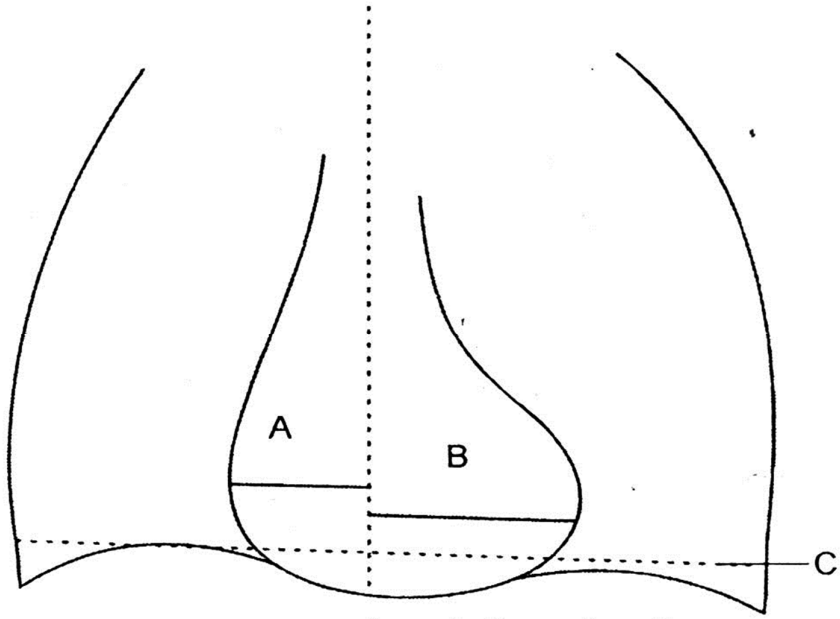
(A) Normal ECG, (B) ST elevation with acute ischemia,

(C) Q-wave with acute myocardial infarction, (D) ST segment depression

(E) ST elevation

CHEST X-RAY

Chest X-Ray is an important, cost effective and simple investigation to diagnose the various diseases affecting the heart and lungs.



Measurement of cardiothoracic ratio

During neonatal period the cardiothoracic ratio upto 70% is normal. In adults, the normal cardiothoracic ratio is 44%.

Cardiomegaly can be considered if the cardiothoracic ratio is exceeding 0.5 in adults and 0.6 in children.

Aims & Objectives

AIMS AND OBJECTIVES

To assess myocardial status in critically ill children admitted in PICU, Paediatric Intensive Care Unit, Stanley Medical College Hospital. using Quantitative Method Troponin T (cTNT) levels, bed side Echo Cardiogram, ECG and Chest X-Ray.

Primary Objective:

- To evaluate myocardial status in critically ill children in PICU to assess the relation between Cardiac Troponin T levels and disease severity with myocardial dysfunction measured by bedside Echocardiography.

Secondary Objective:

To analyse the clinical outcome of myocardial injury in non cardiac cases in terms of

- Need for ionotropic support
- Need for ventilator support
- Length of hospital stay
- Mortality

Review of Literature

REVIEW OF LITERATURE

SJ CLARK ET AL

Clark et all studied the role of Troponin-T in critically ill children admitted in PICU without congenital heart disease. They studied 107 infants out of which 47 were PICU,60 healthy controls. The median (IQR) of cTnT levels in PICU and control group infants were 18(10-60 pg/ml) and 10, ($p<0.001$).they found out a positive correlation between cTnT levels and paediatric index of mortality score ($r=0.41, p=0.004$). They concluded that neonates have higher troponin T levels when compared to infants above 1 year despite not having severe disease.

KEFENTON ET AL

Fenton et al studied the increase in serum levels of troponin I associated with cardiac dysfunction and disease severity in pediatric patients with septic shock. Serial troponin i was studied in 23 children with septic shock during admission and after 72 hours. Echo was perfomed to analyse cardiac dysfunction. PIM score was obtained. Troponin-I elevation was associated with cardiac dysfunction and correlated with severity of illness. Troponin-I was increased in >50% of children with septic shock.

RAJAKUMAR ET AL

Rajakumar et al studied myocardial damage in neonates. He performed a case control study of 30 term neonates(cases) with perinatal asphyxia and 30 term neonates without asphyxia(control).23 babies in cases group had myocardial injury when compared to 1 in control group.mean serum troponin T was 0.22+/-0.28 in cases and in control group 0.003+/-0.018 .cardiac troponin t had better specificity and sensitivity in evaluating cardiac dysfunction and also correlated with disease severity and outcome.

BASHEIR HASSAN ET AL

The study aimed at investigating the occurrence of myocardial injury in critically ill children through troponin t levels and assessment of disease severity and supported by cardiac dysfunction assessed by echocardiography.it was a 6 month study of case control type of 50 patients in PICU of zagazig university Egypt.25 healthy controls were included. Cardiac troponin t levels were significantly higher in critically ill children median 22(18-28) in comparison to healthy children median (10 pg/l, $p<0.05$) cardiac troponin t levels correlated positively with disease severity negative correlation with ejection fraction. There was a statistically significant positive correlation between mortality and high troponin t levels. Elevated troponin t levels were associated with increased duration of ventilation and disease severity.

THIRU Y PATHAN ET AL

The study aimed in analyzing myocardial cytotoxic process involved in cardiac dysfunction of meningococcal septic shock. They studied release of troponin I a marker of myocardial cell death and related this to disease severity and cardiac dysfunction.it was a prospective study done in PICU in patients with meningococcal septicemia. Serum troponin I was measured in 101 children with meningococcal septicemia and serially in 37 children. PIM score was assessed.62%of patients had elevated Troponin-I. Myocardial depression was measured by echocardiogram. Significant positive correlation was observed in troponin I levels and disease severity.

KLEIN GUNNEWIEK ET AL

This study conducted in ICU aimed to determine the incidence of troponin t elevations in critically ill patients and correlating these findings with electrocardiogram and to compare the troponin t patients with troponin t negative patients by clinical parameters.34 patients were studied. Blood samples for troponin t were collected during admission and after 24 hours.11 out of 34(73%) had elevated Troponin-T levels. Significantly p=0.0055 troponin t patients underwent surgery and more significantly p=0.0045 patients suffered from hypotension. There was a positive correlation in critically ill patients and elevated troponin t levels

EISENHUT ET AL

The study aimed at determining the prevalence of myocardial damage in RSV (respiratory syncytial virus infection) evident from elevated Troponin T levels. The study was done in PICU –royal Liverpool children's hospital.34 children were studied,12(35%) had elevated Troponin T levels. The extent of myocardial damage were supported by ECG, ECHO findings. The children with elevated troponin t had hypotension during admission. The study concluded that myocardial damage was common in infants with severe RSV infection without congenital heart disease. Troponin T elevation was associated with hypotension.

J .P QUENOT ET AL

The study aimed at relation between myocardial injury assessed by Troponin I levels and outcome in critically ill patients without acute coronary syndromes or cardiac dysfunction.it was a prospective study in ICU. 217 patients were studied.32%(69 of 217) had elevated levels. Overall mortality was 27%(58 of217).patients with myocardial injury had a mortality rate of 51% compared to 16% of those without myocardial injury. Elevated troponin levels were associated with increased hospital mortality(p=0.01)

C.SPIES ET AL

The study objective was to investigate Troponin T as an early marker of myocardial injury and a prognostic marker of early sepsis.it was a prospective study in surgical ICU.26 patients were included in the study.18 patients had elevated troponin t levels.15 out of 18 expired. High Troponin T values were associated with increased mortality rate

AMMANN ET AL

This study was analysed in 58 critically ill patients other than acute coronary syndrome according to their troponin status. Mortality, LVEF were compared in two groups of troponin positive and negative patients. Among 58 patients,32(55%) were troponin positive. Positive troponin levels were associated with higher mortality(22.4% vs 5.2%,p <0.018) and lower LVEF(p=0.0006)troponin positive patients had significantly higher median levels of TNF-ALPHA AND INTERLEUKIN 6.

G.BRIASSOULIS ET AL

The study was done to assess the incidence of myocardial ischemia in meningococcus induced purpura fulminans in children and to compare troponin levels with ECG changes.22 patients were studied. Serial troponin levels, ECHO, ECG was done in them.5 children had myocardial ischemia, 4 of them died.

ECG ischemic changes was associated with high levels of troponin (1.93+/-0.13 vs 0.18+/-0.08 ng/ml,$p<0.001$) and low LVEF in ECHO. Incidence of myocardial ischemia is higher in meningococcus induced purpura fulminans children.

Materials & Methods

MATERIALS AND METHODS

Study Place :

Pediatric Intensive Care Unit, Institute of Social Pediatrics govt. Stanley Medical College & Hospital, Chennai-1.

Study Duration : 01.04.2017 - 30.9.2017

Study Population : Critically ill children admitted in PICU

Study Design : Hospital based Prospective Observational Study

Sample Size : 112

Inclusion Criteria:

1. Children admitted in PICU from age 1month-12 years.
2. Children with no pre-existing cardiac illness both acquired & congenital

Exclusion Criteria:

1. Neonates
2. Children with pre-existing congenital &acquired cardiac illness
3. Post Cardiac Arrest Resuscitation
4. If parents have not given consent

Study Protocol

Ethical Committee Clearance was obtained to conduct the study in our PICU unit in our hospital. Informed written consent was obtained to conduct the study in our hospital from parents and caregivers before including the children in our study. There was no added harm or risk to the child because of the study.

Sample Collection and Analysis

A detailed history and clinical examination was done for children admitted in PICU fulfilling the inclusion criteria.

CARDIAC TROPONIN(cTnT) in blood was measured on the time of admission in these children. sample was obtained during routine venous access.cardiac troponin was measured in lab using ECLIA method-electrochemiluminescent sandwich enzyme linked immunosorbant assay (ROCHE KIT)has a lower limit of detection value. Values above 0.1ng/ml was taken as positive.

12 lead ECG was recorded on day of admission and was magnified 100% and photocopied for study

Two dimensional M MODE echocardiography was performed bedside by Pediatric cardiologist on the day of admission to identify cardiac abnormalities on these children. It is performed with bedside echo machine

GE 2012 model. Right ventricular hypokinesia and left ventricular hypokinesia supported by low ejection fraction (EF), pulmonary hypertension and right atrial / right ventricle dilatation. Normal ejection fraction 55-75%.

Primary outcome and secondary outcome were studied in these children system wise and illness wise.

The diagnostic modalities like TROPONIN T, ECHO, ECG were evaluated for sensitivity and specificity in comparison with clinical diagnosis of myocardial injury.

STATISTICAL ANALYSIS

The collected data were analysed with IBM.SPSS statistics software 23.0 version to describe about the data descriptive statistics, frequency analysis, percentage analysis were used for categorical variables and the Mean and SD were used for continuous variables.to find the significant difference between the bivariate samples in independent groups the unpaired sample t test was used.to find significance in categorical data chi-square test was used. Similarly if the expected cell frequency is less than 5 in 2x2 tables then the fischer's Exact was used.in all the above statistical tools the probability value 0.05 is considered as significant level.

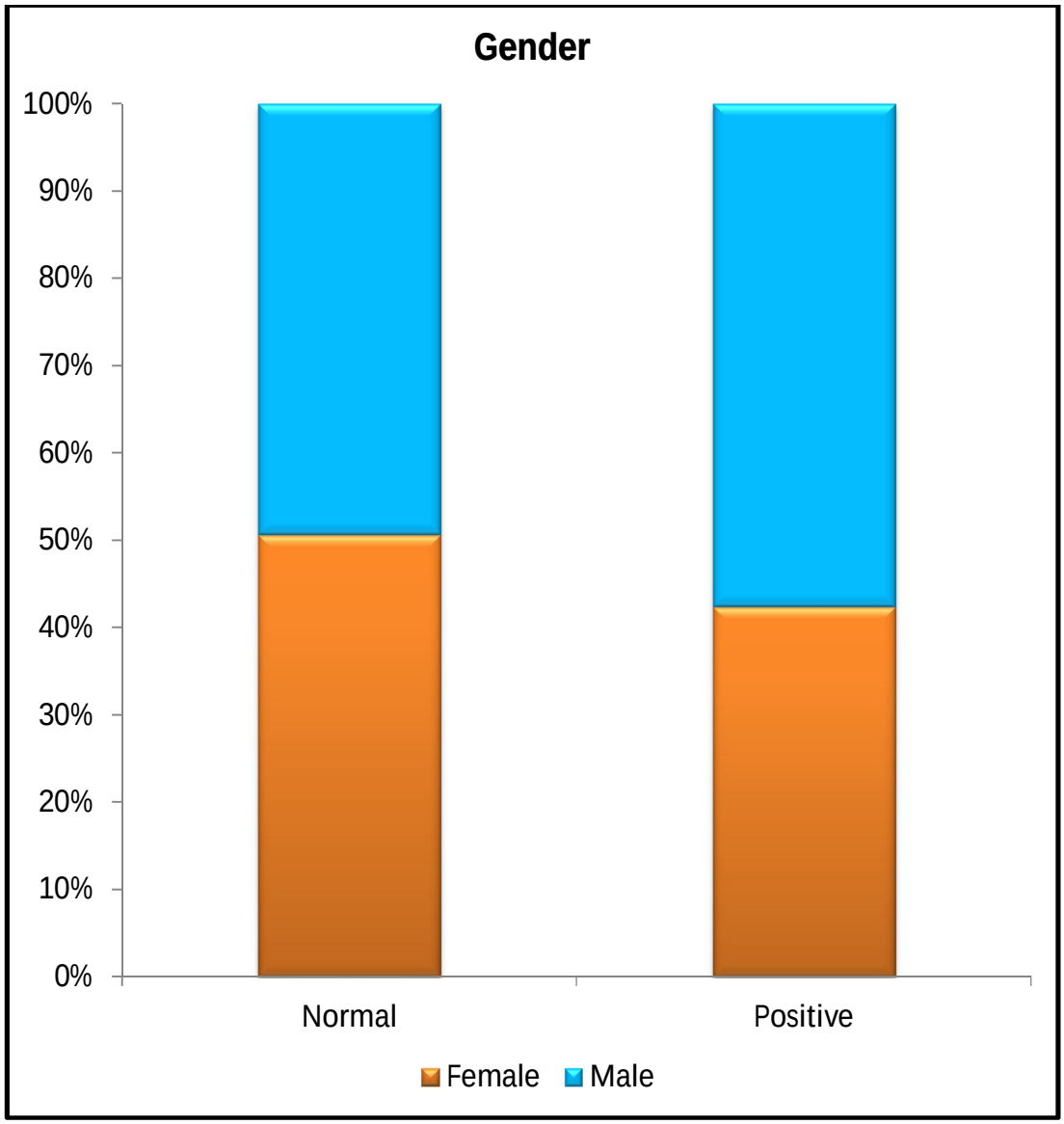
Observation & Results

OBSERVATION AND RESULTS

GENDER WISE DISTRIBUTION

	Normal	**Positive**
Female	50.6%	42.4%
Male	49.4%	57.6%

			Groups		**Total**
			Normal	**Positive**	
Gender	Female	Count	40	14	54
		% within Groups	50.6%	42.4%	48.2%
	Male	Count	39	19	58
		% within Groups	49.4%	57.6%	51.8%
Total		Count	79	33	112
		% within Groups	100.0%	100.0%	100.0%


Gender
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Normal
Positive
Female
Male

Chi-Square Tests					
	Value	**df**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	.628a	1	.428		
Continuity Correction	.342	1	.558		
Likelihood Ratio	.630	1	.427		
Fisher's Exact Test				.535	.280
N of Valid Cases	112				

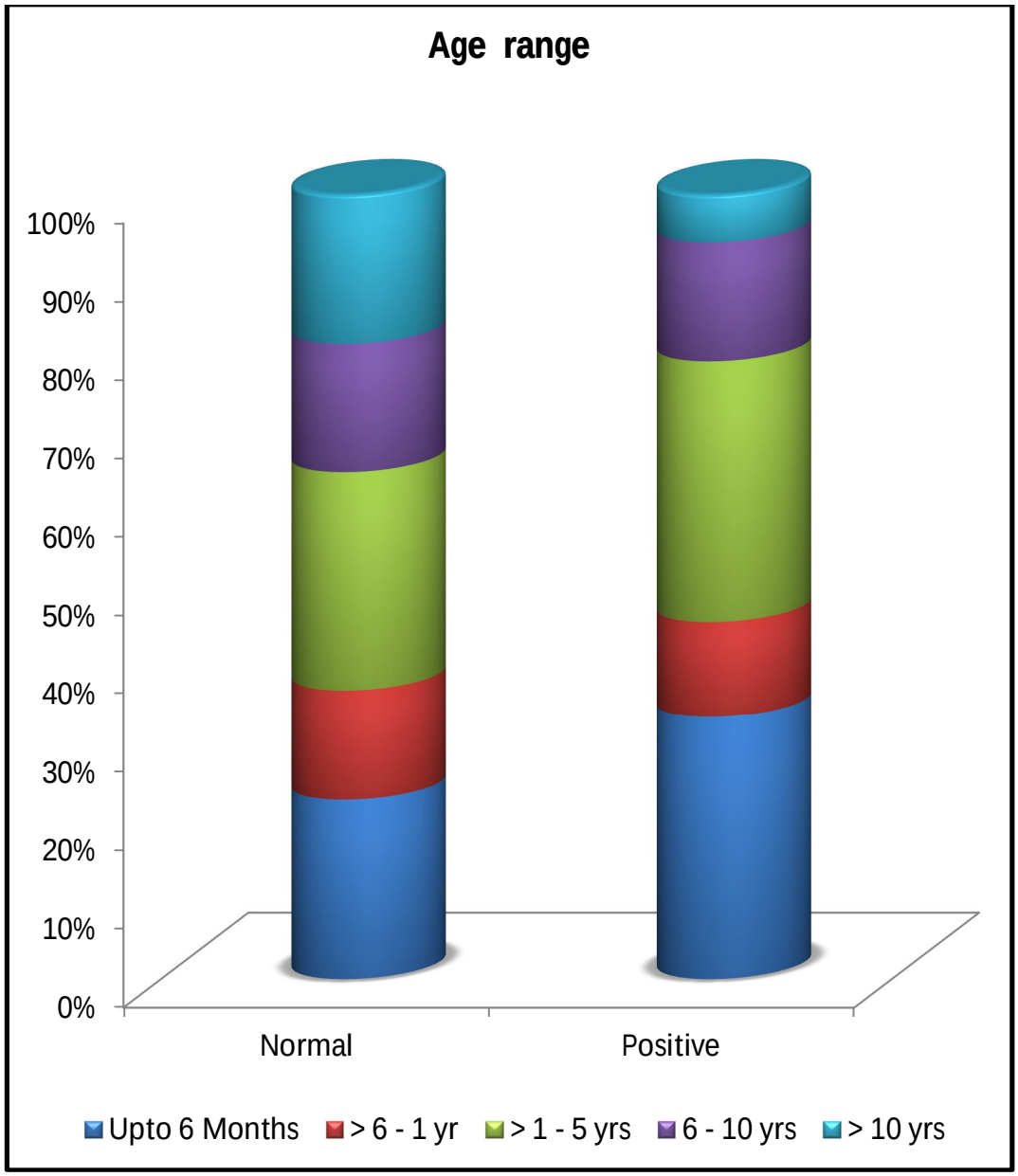
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.91. b. Computed only for a 2x2 table

Among total of 112 children, male 58 children (51.8%), female were 54 children (48.2%). Troponin –T positive children, female were 42.4%, male 57.5%.

AGE WISE DISTRIBUTION

	Normal	Positive
Upto 6 Months	22.8%	33.3%
> 6 - 1 yr	13.9%	12.1%
> 1 - 5 yrs	27.8%	33.3%
6 - 10 yrs	16.5%	15.2%
> 10 yrs	19.0%	6.1%

			Groups		Total
			Normal	Positive	
Age	Upto 6 Months	Count	18	11	29
		% within Groups	22.8%	33.3%	25.9%
	> 6 - 1 yr	Count	11	4	15
		% within Groups	13.9%	12.1%	13.4%
	> 1 - 5 yrs	Count	22	11	33
		% within Groups	27.8%	33.3%	29.5%
	6 - 10 yrs	Count	13	5	18
		% within Groups	16.5%	15.2%	16.1%
	> 10 yrs	Count	15	2	17
		% within Groups	19.0%	6.1%	15.2%
Total		Count	79	33	112
		% within Groups	100.0%	100.0%	100.0%


Age range
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Normal
Positive
Upto 6 Months
> 6 - 1 yr
> 1 - 5 yrs
6 - 10 yrs
> 10 yrs

Chi-Square Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	3.882a	4	.422
Likelihood Ratio	4.313	4	.365
Linear-by-Linear Association	2.617	1	.106
N of Valid Cases	112		

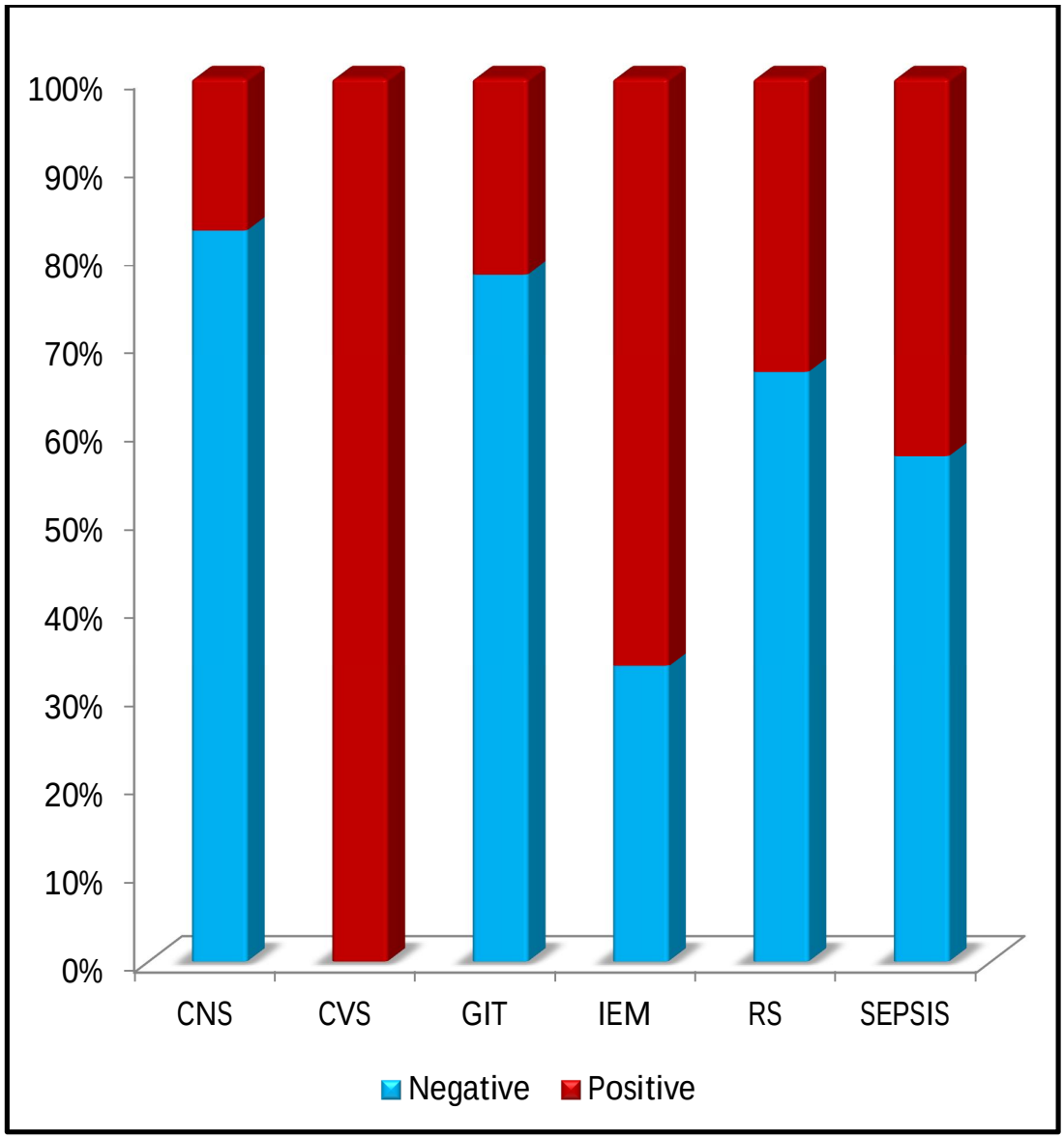
1 cells (10.0%) have expected count less than 5.

The minimum expected count is 4.42.

DISEASES AND OUTCOME

	Negative	Positive
CNS	82.8%	17.2%
CVS	0.0%	100.0%
GIT	77.8%	22.2%
IEM	33.3%	66.7%
RS	66.7%	33.3%
SEPSIS	57.1%	42.9%

DISEASES * OUTCOME Cross tabulation					
			OUTCOME		Total
			N	P	
DISEASES	CNS	Count	24	5	29
		% within DISEASES	82.8%	17.2%	100.0%
	CVS	Count	0	3	3
		% within DISEASES	0.0%	100.0%	100.0%
	GIT	Count	7	2	9
		% within DISEASES	77.8%	22.2%	100.0%
	IEM	Count	1	2	3
		% within DISEASES	33.3%	66.7%	100.0%
	RS	Count	24	12	36
		% within DISEASES	66.7%	33.3%	100.0%
	SEPSIS	Count	4	3	7
		% within DISEASES	57.1%	42.9%	100.0%
Total		Count	60	27	87
		% within DISEASES	69.0%	31.0%	100.0%


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
CNS
CVS
GIT
IEM
RS
SEPSIS
Negative
Positive

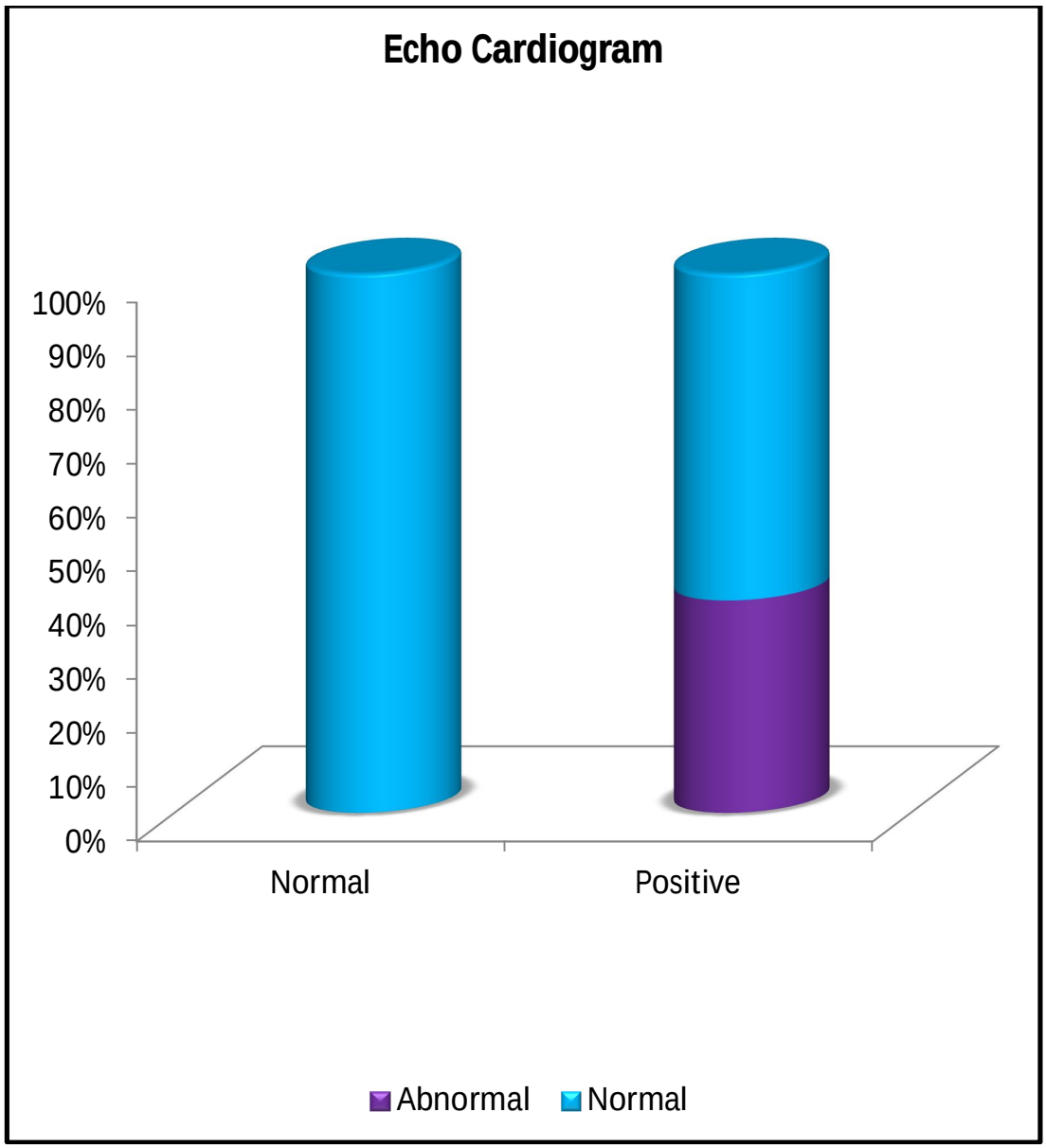
Chi-Square Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	11.897a	5	.036
Likelihood Ratio	12.366	5	.030
N of Valid Cases	87		
a. 7 cells (58.3%) have expected count less than 5. The minimum expected count is .93.			

87 children with diseases in predominant major system have been analysed in detail for their positive correlation, negative correlation and prevalence of cardiac dysfunction. There is a statistically positive significance of p value = 0.036 for major systems CNS, CVS, GIT, IEM, RS and Sepsis.

STUDY POPULATION WITH ECHO CARDIOGRAM CHANGES

	Normal	Positive
Abnormal	0.0%	39.4%
Normal	100.0%	60.6%

Crosstab					
			Groups		Total
			Normal	Positive	
Echo	Abnormal	Count	0	13	13
		% within Groups	0.0%	39.4%	11.6%
	Normal	Count	79	20	99
		% within Groups	100.0%	60.6%	88.4%
Total		Count	79	33	112
		% within Groups	100.0%	100.0%	100.0%


Echo Cardiogram
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Normal
Positive
Abnormal
Normal

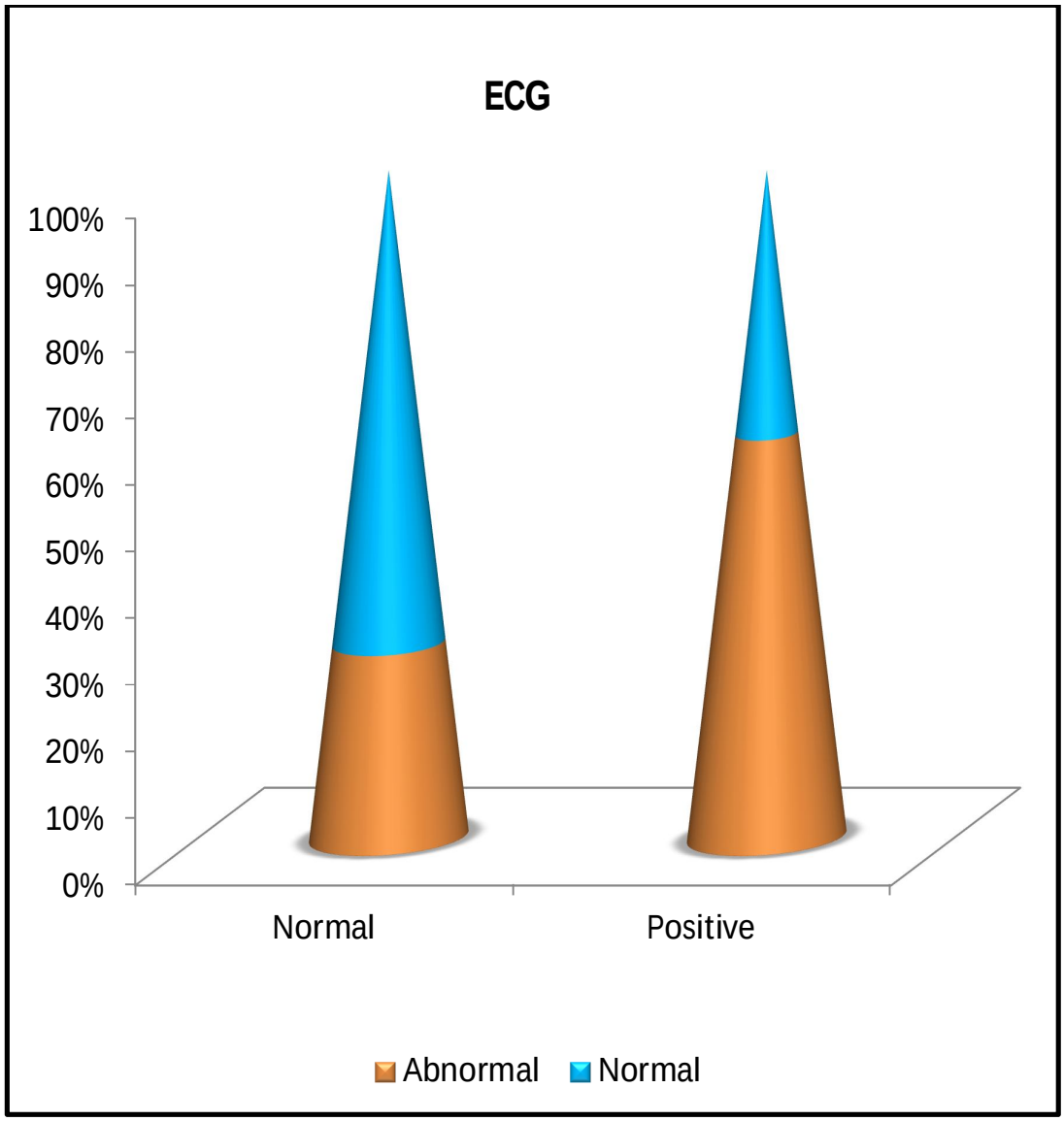
Chi-Square Tests					
	Value	**df**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	35.208a	1	.000		
Continuity Correctionb	31.473	1	.000		
Likelihood Ratio	36.170	1	.000		
Fisher's Exact Test				.0005	.000
N of Valid Cases	112				
a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 3.83. b. Computed only for a 2x2 table					

There is a statistically significant p value = 0.0005 of cardiac dysfunction (Troponin-T positivity and Positive Echo findings).

STUDY POPULATION WITH ECG

	Normal	Positive
Abnormal	29.1%	60.6%
Normal	70.9%	39.4%

Crosstab					
			Groups		Total
			Normal	Positive	
ECG	Abnormal	Count	23	20	43
		% within Groups	29.1%	60.6%	38.4%
	Normal	Count	56	13	69
		% within Groups	70.9%	39.4%	61.6%
Total		Count	79	33	112
		% within Groups	100.0%	100.0%	100.0%


ECG
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Normal
Positive
Abnormal
Normal

Chi-Square Tests					
	Value	**df**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	9.760a	1	.002		
Continuity Correctionb	8.474	1	.004		
Likelihood Ratio	9.622	1	.002		
Fisher's Exact Test				.003	.002
N of Valid Cases	112				

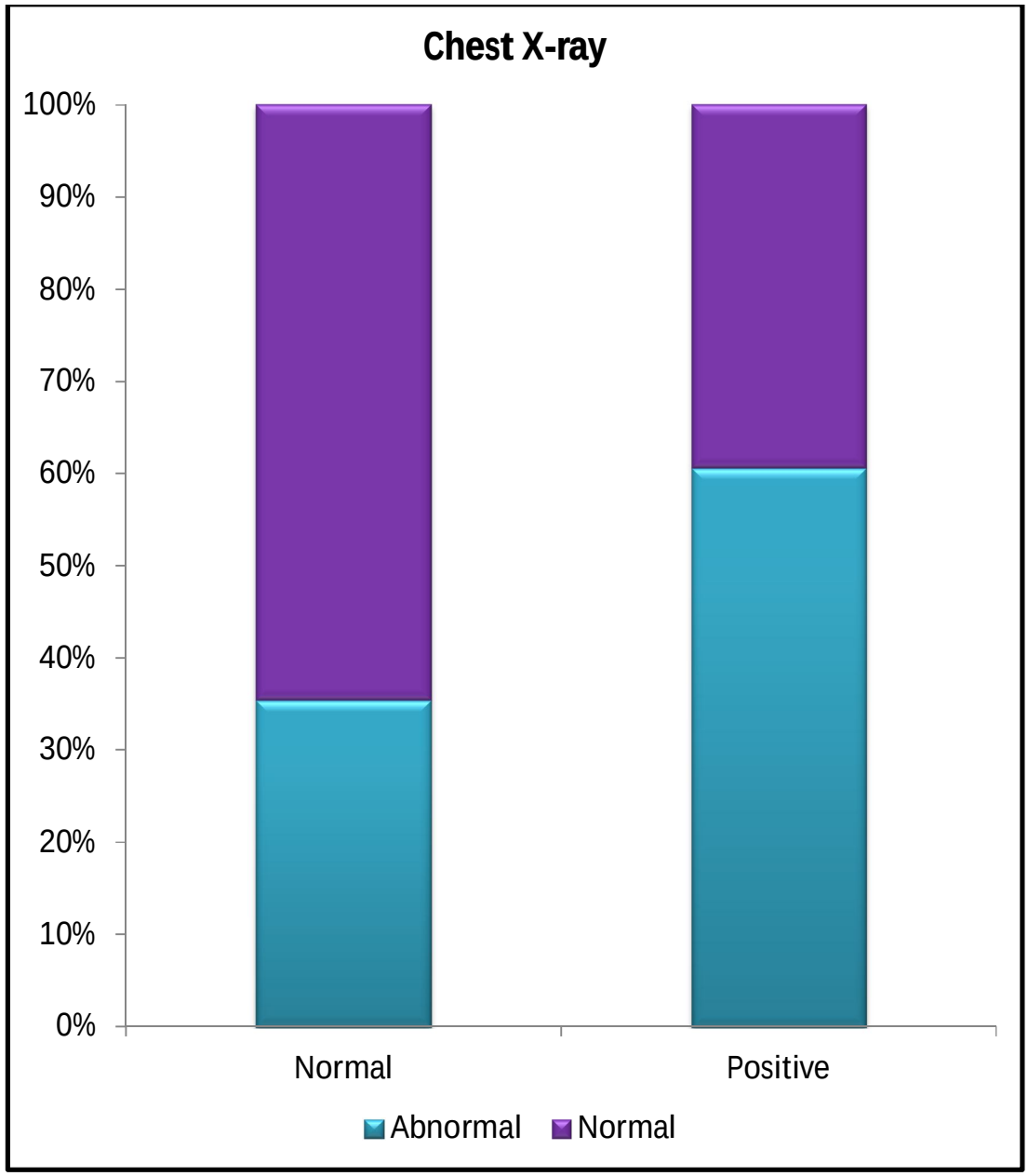
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.67. b. Computed only for a 2x2 table

There is a statistically significant p value = 0.002 of cardiac dysfunction (Troponin-T positivity and Positive ECG findings).

STUDY POPULATION WITH CHEST-XRAY CHANGES

	Normal	**Positive**
Abnormal	35.4%	60.6%
Normal	64.6%	39.4%

			Groups		**Total**
			Normal	**Positive**	
Chest X-ray	Abnormal	Count	28	20	48
		% within Groups	35.4%	60.6%	42.9%
	Normal	Count	51	13	64
		% within Groups	64.6%	39.4%	57.1%
Total		Count	79	33	112
		% within Groups	100.0%	100.0%	100.0%


Chest X-ray
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Normal
Positive
Abnormal
Normal

Chi-Square Tests					
	Value	**df**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	6.018a	1	.014		
Continuity Correctionb	5.035	1	.025		
Likelihood Ratio	5.997	1	.014		
Fisher's Exact Test				.021	.013
N of Valid Cases	112				

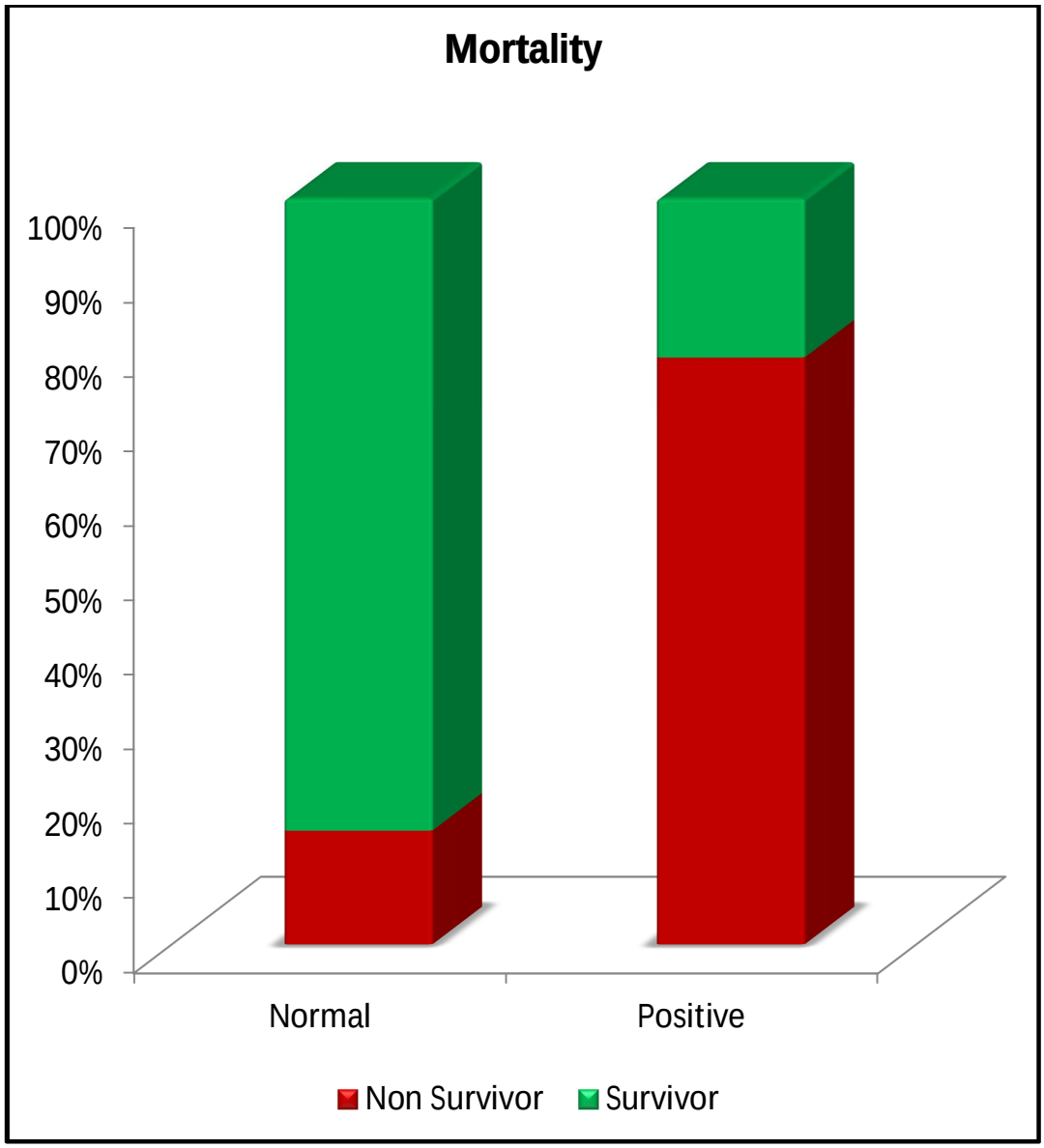
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.14.
b. Computed only for a 2x2 table

There is a statistically significant p value = 0.014 of cardiac dysfunction (Troponin-T positivity and Positive Chest X-Ray findings).

PRIMARY OUTCOME

	Normal	**Positive**
Non Survivor	15.2%	78.8%
Survivor	84.8%	21.2%

			Groups		Total
			Normal	Positive	
Mortality	Non Survivor	Count	12	26	38
		% within Groups	15.2%	78.8%	33.9%
	Survivor	Count	67	7	74
		% within Groups	84.8%	21.2%	66.1%
Total		Count	79	33	112
		% within Groups	100.0%	100.0%	100.0%


Mortality
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Normal
Positive
Non Survivor
Survivor

Chi-Square Tests					
	Value	**df**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	41.998a	1	.0005		
Continuity Correctionb	39.209	1	.000		
Likelihood Ratio	42.074	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	112				

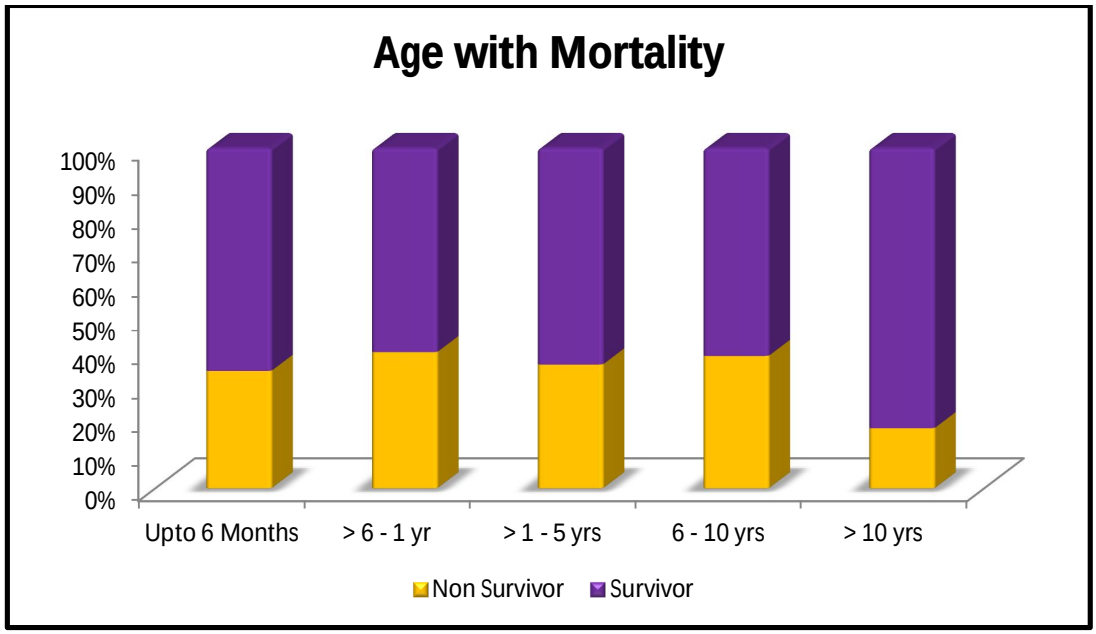
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 11.20.
b. Computed only for a 2x2 table

The difference between mortality among Troponin-T positive and negative children was statistically significant p value = 0.0005 was evident by Pearson Chi-Square test.

AGE WITH MORTALITY

	Non Survivor	Survivor
Upto 6 Months	34.5%	65.5%
> 6 - 1 yr	40.0%	60.0%
> 1 - 5 yrs	36.4%	63.6%
6 - 10 yrs	38.9%	61.1%
> 10 yrs	17.6%	82.4%

Age * Mortality Cross tabulation					
			Mortality		Total
			Non Survivor	Survivor	
Age	Upto 6 Months	Count	10	19	29
		% within Age	34.5%	65.5%	100.0%
	> 6 - 1 yr	Count	6	9	15
		% within Age	40.0%	60.0%	100.0%
	> 1 - 5 yrs	Count	12	21	33
		% within Age	36.4%	63.6%	100.0%
	6 - 10 yrs	Count	7	11	18
		% within Age	38.9%	61.1%	100.0%
	> 10 yrs	Count	3	14	17
		% within Age	17.6%	82.4%	100.0%
Total		Count	38	74	112
		% within Age	33.9%	66.1%	100.0%



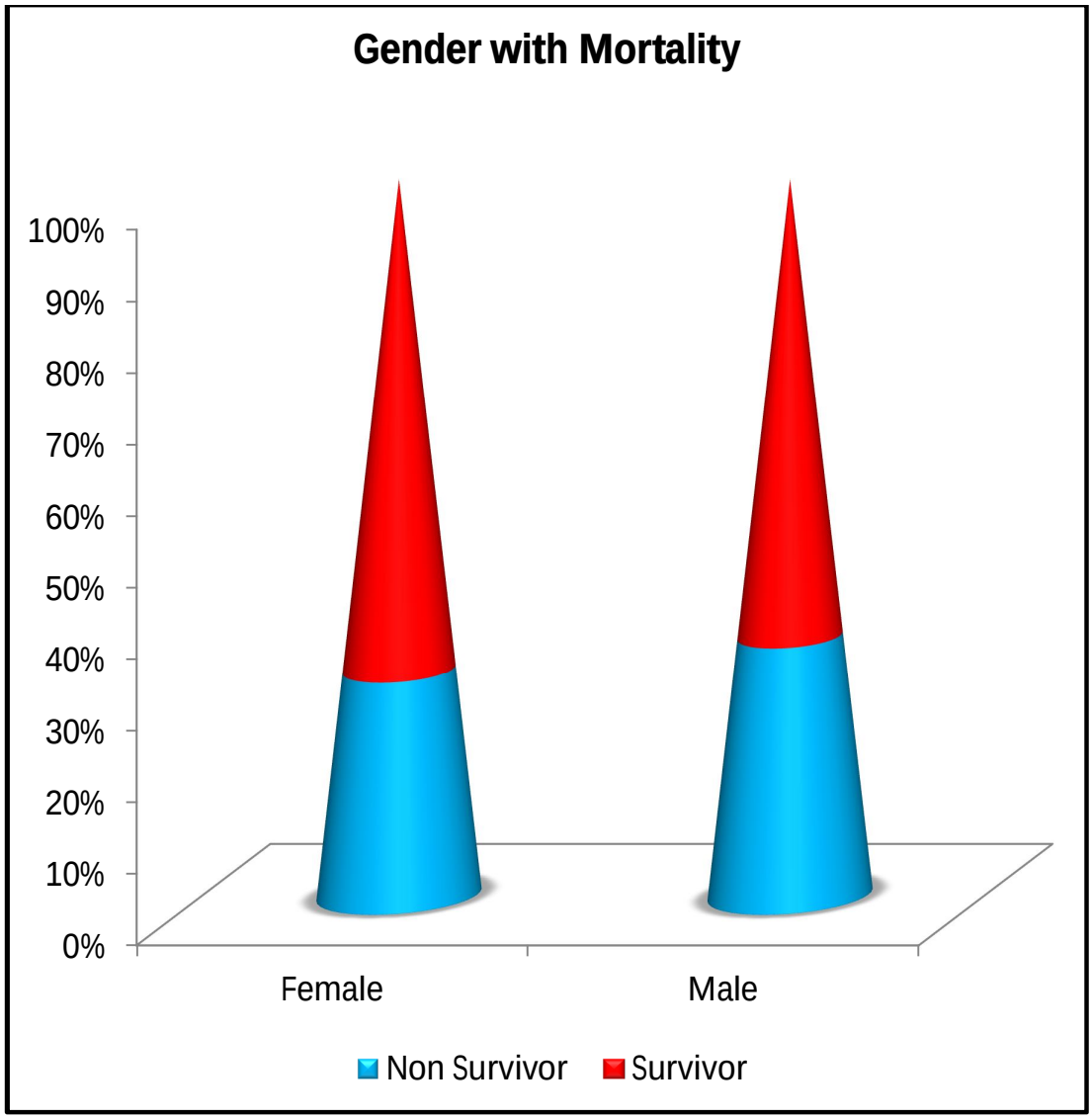
Chi-Square Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	2.546a	4	.636
Likelihood Ratio	2.770	4	.597
N of Valid Cases	112		
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.09.			

Though <1 year mortality is 40% which is slightly higher when compare to other age groups. There is no statistical significance between age group and mortality.

GENDER WITH MORTALITY

	Non Survivor	Survivor
Female	31.5%	68.5%
Male	36.2%	63.8%

Gender * Mortality Crosstabulation					
			Mortality		Total
			Non Survivor	Survivor	
Gender	Female	Count	17	37	54
		% within Gender	31.5%	68.5%	100.0%
	Male	Count	21	37	58
		% within Gender	36.2%	63.8%	100.0%
Total		Count	38	74	112
		% within Gender	33.9%	66.1%	100.0%


Gender with Mortality
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Female
Male
Non Survivor
Survivor

Chi-Square Tests					
	Value	**df**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	.279a	1	.598		
Continuity Correctionb	.108	1	.743		
Likelihood Ratio	.279	1	.597		
Fisher's Exact Test				.691	.372
N of Valid Cases	112				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 18.32.
b. Computed only for a 2x2 table

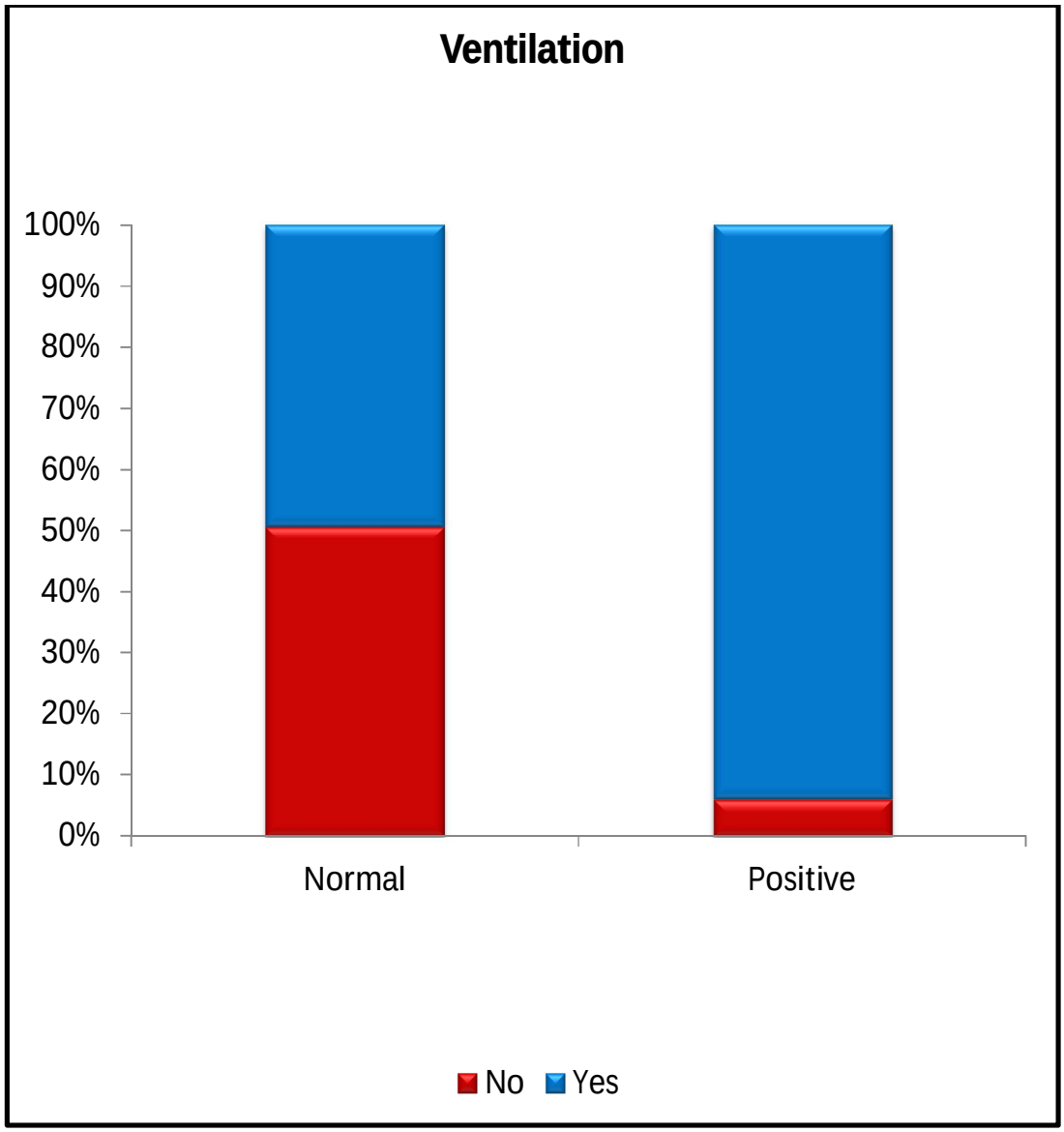
Male non survivor = 36.2%, Female non survivor = 31.5%. Though there is increased percentage preponderance for male sex, there is no statistical significance between sex and mortality.

SECONDARY OUTCOME

NEED FOR VENTILATION

	Normal	Positive
No	50.6%	6.1%
Yes	49.4%	93.9%

			Groups		Total
			Normal	Positive	
V	No	Count	40	2	42
		% within Groups	50.6%	6.1%	37.5%
	Yes	Count	39	31	70
		% within Groups	49.4%	93.9%	62.5%
Total		Count	79	33	112
		% within Groups	100.0%	100.0%	100.0%


Ventilation
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Normal
Positive
No
Yes

Chi-Square Tests					
	Value	**df**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	19.731a	1	.000		
Continuity Correctionb	17.875	1	.000		
Likelihood Ratio	23.596	1	.000		
Fisher's Exact Test				.0005	.000
N of Valid Cases	112				

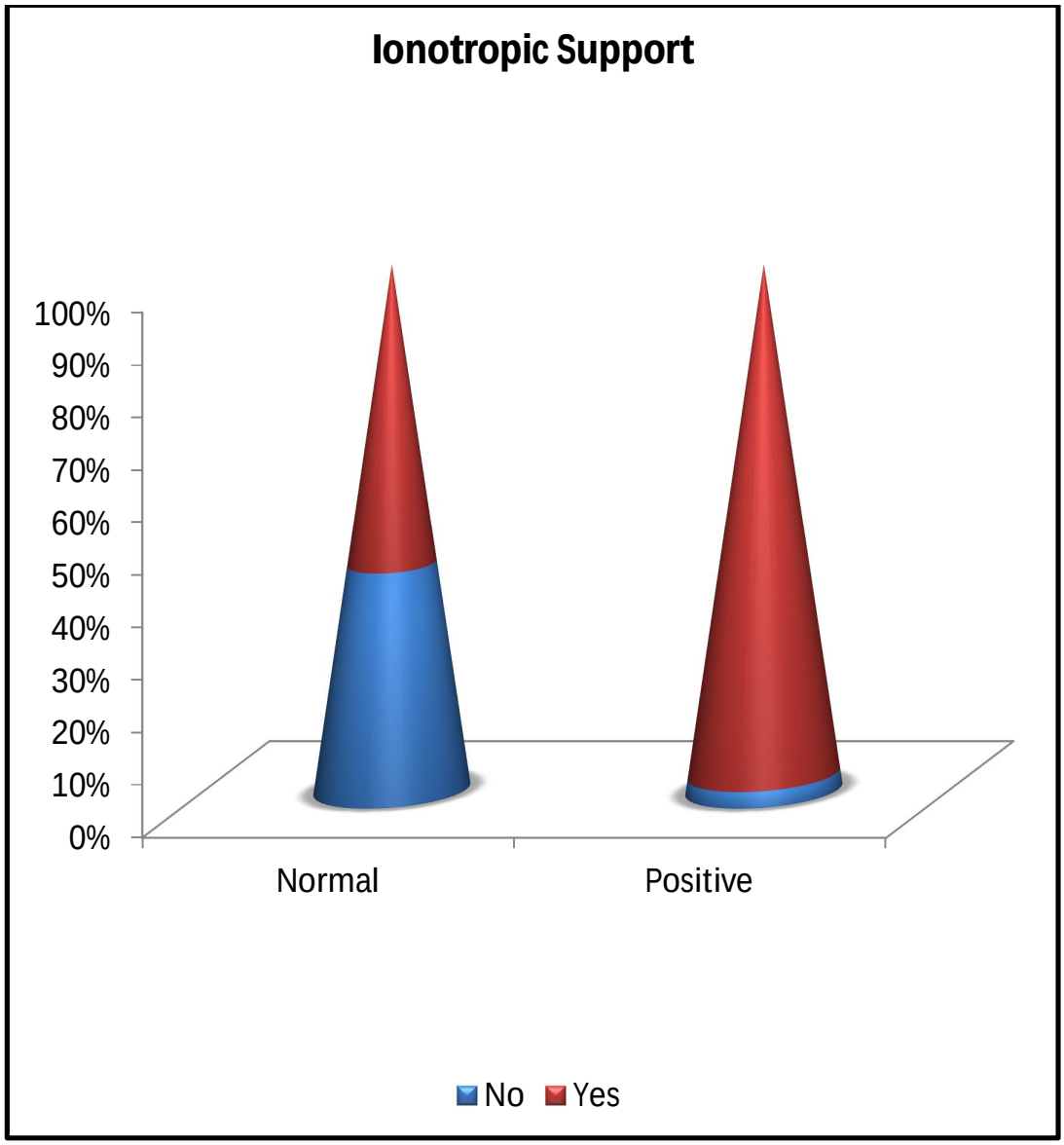
a. 0 cells (.0%) have expected count less than 5.
The minimum expected count is 12.38.
b. Computed only for a 2x2 table

There was a significant statistic correlation p value = 0.0005 between cardiac dysfunction and need for ventilation.

NEED FOR IONOTROPIC SUPPORT

	Normal	Positive
No	43.0%	3.0%
Yes	57.0%	97.0%

			Groups		Total
			Normal	Positive	
IS	No	Count	34	1	35
		% within Groups	43.0%	3.0%	31.3%
	Yes	Count	45	32	77
		% within Groups	57.0%	97.0%	68.8%
Total		Count	79	33	112
		% within Groups	100.0%	100.0%	100.0%


Ionotropic Support
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Normal
Positive
No
Yes

Chi-Square Tests					
	Value	**df**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	17.342a	1	.000		
Continuity Correction	15.529	1	.000		
Likelihood Ratio	22.180	1	.000		
Fisher's Exact Test				.0005	.000
Linear-by-Linear Association	17.187	1	.000		
N of Valid Cases	112				

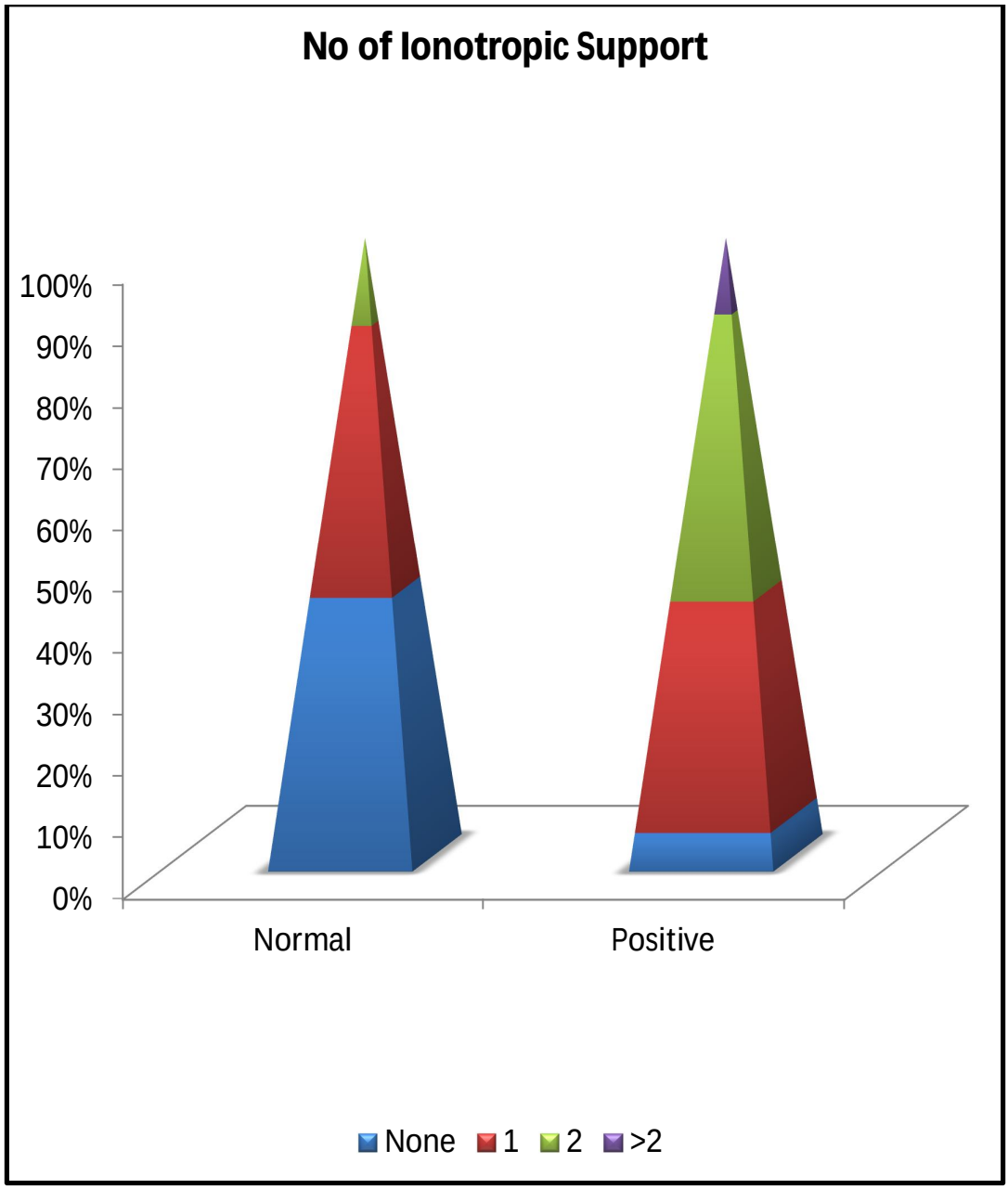
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.31.
b. Computed only for a 2x2 table

There was a significant statistic correlation p value = 0.0005 between cardiac dysfunction and need for Ionotropic Support.

NEED FOR HIGHER NUMBER OF IONOTROPES

	Normal	Positive
None	43.0%	6.1%
1	43.0%	36.4%
2	13.9%	45.5%
>2	0.0%	12.1%

			Groups		Total
			Normal	Positive	
No of IS	None	Count	34	2	36
		% within Groups	43.0%	6.1%	32.1%
	1	Count	34	12	46
		% within Groups	43.0%	36.4%	41.1%
	2	Count	11	15	26
		% within Groups	13.9%	45.5%	23.2%
	> 2	Count	0	4	4
		% within Groups	0.0%	12.1%	3.6%
Total		Count	79	33	112
		% within Groups	100.0%	100.0%	100.0%


No of Ionotropic Support
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Normal
Positive
None
1
2
>2

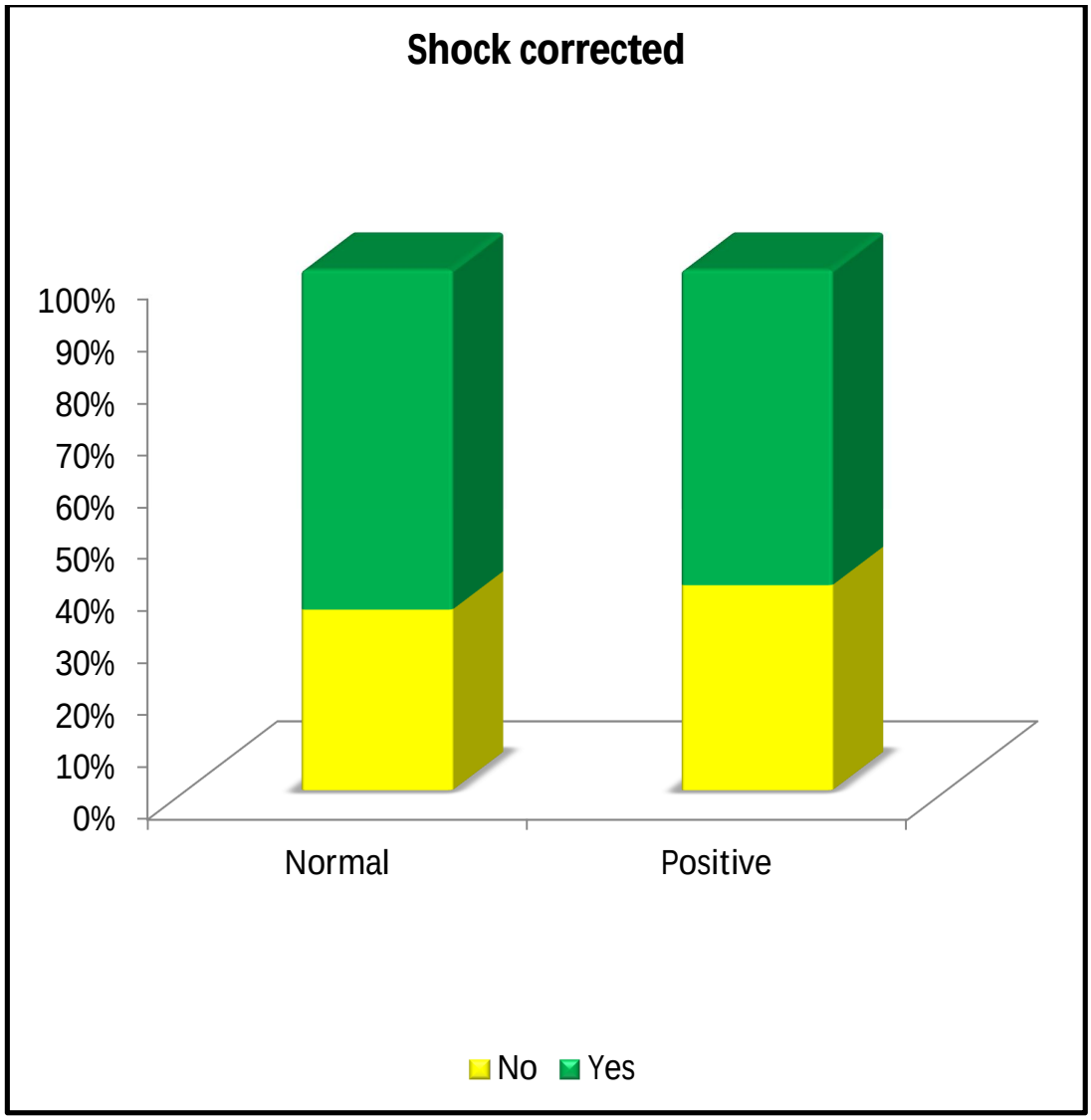
Chi-Square Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	29.698a	3	.0005
Likelihood Ratio	32.123	3	.000
Linear-by-Linear Association	28.509	1	.000
N of Valid Cases	112		
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 1.18.			

This diagram depicts the need for >1 number of ionotropes there is a statistical significance of p value 0.0005 between cardiac dysfunction and >1 ionotropic support.

SHOCK CORRECTED AND REFRACTORY SHOCK

	Normal	Positive
No	34.7%	39.4%
Yes	65.3%	60.6%

			Groups		Total
			Normal	Positive	
SC	NO	Count	17	13	30
		% within Groups	34.7%	39.4%	36.6%
	YES	Count	32	20	52
		% within Groups	65.3%	60.6%	63.4%
Total		Count	49	33	82
		% within Groups	100.0%	100.0%	100.0%


Shock corrected
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Normal
Positive
No
Yes

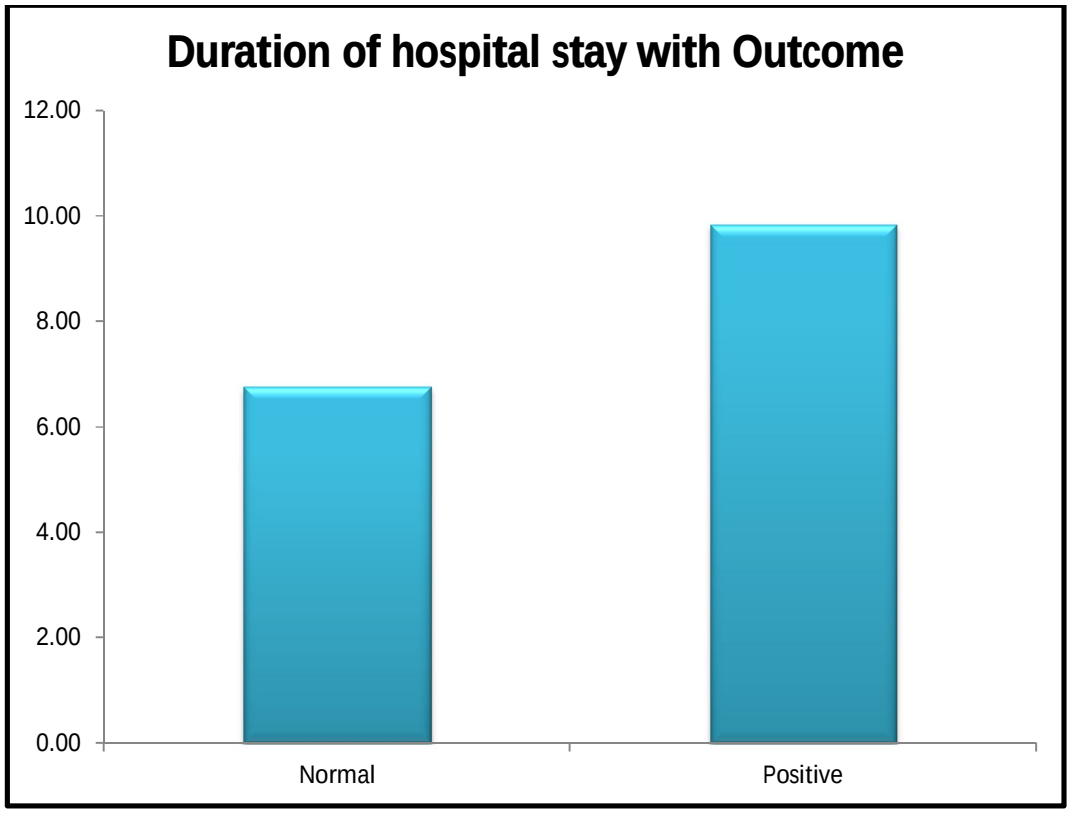
Chi-Square Tests					
	Value	**df**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	.188a	1	.665		
Continuity Correctionb	.040	1	.842		
Likelihood Ratio	.187	1	.665		
Fisher's Exact Test				.815	.419
N of Valid Cases	82				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.07.
b. Computed only for a 2x2 table

DURATION OF HOSPITAL STAY WITH OUTCOME

Group Statistics					
Groups		N	Mean	Std. Deviation	Std. Error Mean
Duration	Normal	79	6.75	7.680	.864
	Positive	33	9.82	11.190	1.948

Independent Samples Test					
	t-test for Equality of Means				
	t	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**
Duration	-1.441	45.116	.156	-3.071	2.131



This graph depicts the median days of hospital stay in each group.

Discussion

DISCUSSION

Cardio vascular dysfunction and myocardial necrosis is one of the commonest complications encountered by children admitted in PICU. Acute Severe Myocardial Dysfunction Contributes A Significant Cause Of Mortality And Morbidity In Critically Ill Children Admitted In PICU. Severity assessment of illness and outcome in critically ill children is important as it influences management strategies and resource allocation. Myocardial ischemia, myocyte death may occur directly due to stress factors imposed on heart due to several Non cardiac etiology such as Hypoxia, shock, sepsis, Acute kidney injury, MODS, electrolyte abnormalities, hypovolemia, anemia, hypertension, post surgery, drugs, toxins released due to viral and other underlying infections. Second phase there is direct myocyte death due to direct effects and also activation of innate immune response which contributes to further myocardial damage. Third phase the antibodies released by viral specific responses continue to damage myocardium resulting in dilated cardiomyopathy in a genetically predisposed individual. Myocardial damage results in contractile dysfunction and ventricular dilatation. Papillary muscle dysfunction can cause valvular regurgitation. Pericardial effusion can also occur.

This study was performed to determine cardiovascular changes with various diagnostic modalities in early diagnosis of myocardial injury and early intervention thereby facilitating better treatment protocol and thereby subsequent reduction in mortality & morbidity. In this study we studied cardiac status of critically ill children with parameters like elevated Troponin T, Bedside ECHO changes like fall in ejection fraction, valvular regurgitation, dilated cardiomyopathy, papillary muscle dysfunction, pulmonary hypertension and ECG changes like T Wave Inversion, ST Elevation, U Wave, Q Wave abnormality.

BASHEIR ET AL study showed there was a statistically significant positive correlation between mortality and high troponin t levels.

FENTON ET AL study studied the increase in serum levels of troponin I associated with cardiac dysfunction and disease severity in pediatric patients with septic shock.

SJ CLARK ET AL studied the role of troponin t in critically ill children in PICU without congenital heart disease. They found a positive correlation between high troponin t and PIM score and concluded that neonates have higher troponin t levels compared to infants despite having less severe disease.

AMMANN ET AL study analysed critically ill patients according to their troponin status.higher troponin levels were associated with higher mortality and lower LVEF. Troponin positive patients have significantly higher median levels of tumour necrosis factor alpha and interleukin 6.

C SPIES ET AL study objective was to investigate troponin t as early marker of myocardial injury and a prognostic marker of early sepsis. In our study there was a statistically significant association between elevated TROPONIN T values and cardiac dysfunction. Children with Respiratory diseases, viral myocarditis, septic shock, Acute CNS infection, had statistically significant cardiac dysfunction when compared to other illnesses.

Regarding positive troponin t levels and echocardiographic changes children with significant structural changes in echocardiogram were positive for Troponin-T.

33 children out of 112 children had cardiac dysfunction evident with elevated Troponin-T levels. Total mortality was 38 children out of which 25 children had elevated troponin t levels. Echocardiographic abnormality was found among 13 children all 13 had elevated troponin t levels. 33 children in the study had positive ECG findings and among those children 14 children had elevated troponin t levels

36 children with Respiratory diseases like bronchopneumonia, aspiration pneumonia, pyothorax, near fatal asthma, bronchiolitis, WALRI, collapse with consolidation were studied. 12 children had cardiac dysfunction. 30% of children had cardiac dysfunction

Viral myocarditis cases 3 cases were studied. All children had significant cardiac dysfunction, with positive Troponin-T levels, positive ECHO like fall in LVEF, Dilated cardiomyopathy, Valvular regurgitation and ECG findings like ST elevation, T wave inversion 100% cardiac dysfunction observed in such children. Our study correlates well with AMMANN ET AL.

29 children with CENTRAL NERVOUS SYSTEM illnesses like Acute CNS infections, encephalitis, GBS, hydrocephalus, Status epilepticus, refractory seizures, intracranial hemorrhage, demyelinating illnesses were studied.40% of acute CNS infection children had cardiac dysfunction,100% of encephalitis children had cardiac dysfunction. Total of 5 children out of 29, 17.5 % had cardiac dysfunction

9 children with GIT disorders were included in the study, 2 had cardiac dysfunction, 22.2% of these children had cardiac dysfunction.

Children with septic shock all had cardiac dysfunction making association of 100%which indicates sepsis causes early myocyte damage and necrosis.in this aspect our study correlates with C SPIES ET AL & FENTON ET AL.

Scorpion sting cases 50% had cardiac dysfunction, IEM children 66.7% of them had cardiac dysfunction

Diabetic keto acidosis children had no cardiac dysfunction whereas congenital hypothyroidism with pericardial effusion had cardiac dysfunction with elevated Troponin-T, Positive ECHO and ECG findings.

Acute kidney injury case on hemodialysis had no cardiac dysfunction Children with viral fever with thrombocytopenia had no underlying cardiac dysfunction.

Various poisonings and snake bite cases also had no underlying cardiac dysfunction.

In our study 33 out of 112 children - 29.5% had clinical evidence of myocardial injury testing positive for Troponin T.

13 cases tested positive for all 3 modalities ECHO, ECG & Troponin-T. Total mortality was 38 children among which 25 had elevated Troponin-T levels.

In our study we found that there was a statistically significant correlation with positive Troponin T levels in terms of mortality and morbidity in form of need for ventilation, shock correction, ionotropic support, duration of hospital stay and prompt early detection of myocyte damage can improve the outcome with appropriate intervention. Cardiac troponin t has been used to assess the prevalence of myocardial injury in critically ill children in PICU supported by ECHO,ECG findings. Our study coin cides with the one observed by SJ CLARK ET AL

Overall Troponin T is a valuable tool for early detection of myocyte damage and assessment of cardiac status in critically ill children in PICU.

COMPARISON WITH OTHER STUDIES

Parameter	Our study	Clark et al	Bashir Hassan et al	KE fenton et al	King et al
Sample	PICU 112 cases	PICU 47cases 60controls	PICU 25cases 25controls	PICU 23 septic shock cases	ICU 120 cases
ECG changes	33 cases				
ECHO changes	13 cases		Present in 22 cases	13 cases	
LVEF shortening	12 cases		Shortening in 22 cases	LVEF fall in 13 cases	
Troponin	High in 33 cases	High in 17/22 ventilated infants	High in 22cases correlates with ventricular dysfunction	Troponin I increased in 13 cases	Troponin I elevated in 15 cases of sepsis
Mortality	38	2 cases	16 cases	10	24
Remarks	Positive correlation between positive cTnT and mortality & morbidity Negative correlation with LVEF	Positive correlation between cTNT and mortality score	Positive correlation between cTNT and PIM II score, mortality, severity. Negative correlation with LVEF	Troponin I increase in >50% of septic children Correlated with PIM II mortality score and multiple organ failure	TROPONIN increase correlated with APACHE II score, positive correlation in multiorgan dysfunction

Parameter	Our study	Agrawal et al	Costa et al	Thiru y et al
Sample	PICU 112 cases	NICU 60 asphyxiated	NICU 29asphyxiated 30 controls	PICU 101 cases meningococcal septicemia
ECG changes	33 cases	Present in 46 infants	Present	
ECHO changes	13 cases		Present	32 cases
Ejection fraction	12 cases		Present in 1	LVEF shortening in 32 cases
Troponin	High in 33 cases	CK,CK-MB, Troponin elevated	LVEF shortening in asphyxiated	Troponin T high in 63 cases
Mortality	38	16	9	
Remarks	Positive correlation between positive cTnT and mortality & morbidity Negative correlation with LVEF	Troponin I &CK-MB were elevated in asphyxiated and in non-survivors	Troponin T valuable tool in asphyxiated babies to detect myocardial injury	Positive correlation with Troponin levels, diseases severity, myocardial depression and ionotropic support

Limitations of the study

LIMITATIONS OF THE STUDY

1. There was no control group in the study.
2. No serial Troponin-T levels & Serial Echocardiogram, Serial ECG was done.
3. Comparison with other cardiac bio-markers like CK-MB, LDH, Troponin-I was not done.
4. Autopsy was not done in non-survivors as parents refused to give consent.

Recommendations

RECOMMENDATIONS

1. Cardiac dysfunction is not limited to cardiovascular system alone hence children with other non cardiac etiology illnesses have to be evaluated for cardio vascular dysfunction.

2. Cardiac abnormalities in PICU are often under diagnosed and hence high index of suspicion and investigation for the same are required.

3. Troponin–T, ECG and ECHO help in early recognition and hence better management of critically ill children in PICU.

Conclusion

CONCLUSION

Myocardial assessment was done in critically ill children in picu revealed myocardial damage occuring in non-cardiac illnesses. 29.5% among the total children had cardiac dysfunction. Cardiac dysfunction was evident by the gold standard quantitative ECLIA positive Troponin T levels cardiac dysfunction was supported by Bedside ECHO, ECG findings. There was increased incidence of overall mortality in children with cardiac dysfunction. Children with cardiac dysfunction also needed prolonged ventilatory support, ionotropic support and shock correction. Duration of hospital stay was also high in children with cardiac dysfunction. Troponin T, ECHO, ECG findings were significantly positive among non-survivors.

Low Ejection fraction, Dilated cardiomyopathy, Papillary muscle dydfunction, Valvular regurgitation ,pulmonary hypertension were present in children with cardiac dysfunction. T Wave changes, ST changes, low voltage complexes, U wave, Tachycardia were significant ECG findings. Further studies are necessary to validate these findings.

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Annexures

ABBREVIATIONS

1.	cTnT	-	TROPONIN T
2.	cTnI	-	TROPONIN I
3.	ECG	-	ELECTROCARDIOGRAM
4.	ECHO	-	ECHOCARDIOGRAM
5.	CXR	-	CHEST XRAY
6.	LVEF	-	LEFT VENTRICULAR EJECTION FRACTION
7.	PICU	-	PEDIATRIC INTENSIVE CARE UNIT
8.	NICU	-	NEONATAL INTENSIVE CARE UNIT
9.	CK-MB	-	CREATININE KINASE MYOCARDIAL BOUND
10.	LDH	-	LACTATE DEHYDROGENASE
11.	CVS	-	CARDIOVASCULAR SYSTEM
12.	RS	-	RESPIRATORY SYSTEM
13.	GIT	-	GASTROINTESTINAL SYSTEM
14.	CNS	-	CENTRAL NERVOUS SYSTEM
15.	IEM	-	INBORN ERRORS OF METABOLISM
16.	PIM-II SCORE	-	PEDIATRIC INDEX OF MORTALITY SCORE
17.	MOD	-	MULTI ORGAN DYSFUNCTION

"ASSESSMENT OF MYOCARDIAL STATUS IN CRITICALLY ILL CHILDREN ADMITTED IN PICU, PAEDIATRIC INTENSIVE CARE UNIT, STANLEY MEDICAL COLLEGE HOSPITAL"

PROFORMA

1. NAME :
2. AGE :
3. SEX :
4. MRD / OP NO. :
5. COMPLAINTS :
6. PROVISIONAL DIAGNOSIS :
7. HISTORY
   - i) Known case of Chronic Illness - Yes / No
   - ii) Whether illness acute / chronic in onset - Yes / No
   - iii) Known case of systemic illness - Yes / No
8. GENERAL EXAMINATION :
9. SYSTEMIC EXAMINATION:
   - Cardiovascular System :
   - Respiratory System :
   - Gastrointestinal System :
   - Central Nervous System :
10. VITALS
    - Pulse :
    - Heart Rate :
    - NIBP :
    - RR :
    - CRT :

11. SPO2 :

12. ANTHROPOMETRY :

Height	:	Head Circumference :
Weight	:	Chest Circumference:
Body Mass Index	:	Mid Arm Circumference :

13. IMMUNISATION STATUS :

14. NUTRITION STATUS :

TREATMENT RECEIVED INPICU:

1. Iono Tropes - Yes / No
   If yes, a) Dopamine b) Adrenaline c) Dobutamine
2. Volume Resuscitation - Yes / No
   If yes, a) How many boluses?
3. Ventilation - Yes / No
   If yes, a) Duration of ventilation b) Mode of ventilation
4. Shock - Yes / No
   If yes, Corrected or Refractory Shock
5. Electrolyte Abnormalities - Yes / No
   If yes, Corrected
6. Liver parameter - Normal / Abnormal
7. Renal Parameters - Normal / Abnormal
8. Hematological Profile - Normal / Abnormal
9. ABG - Done / Not Done / Normal / Abnormal
10. Infective Etiology Treatment - Yes / No
11. Other Comorbidities - Yes / No

TYPE OF TREATMENT RECEIVED IN PICU:

1. MEDICAL

2. INTERVENTIONAL / SURGICAL PROESURE

INVESTIGATIONS:

Serum Troponin – T, ECLIA , Quantitative Method on admission	
Complete Blood Count	
Renal Function Test	
Liver Function Test - Total Bilirubin - Direct Bilirubin - SGOT - SGPT - ALP - Total protiein - Albumin	
Peripheral Smear for cell study	
Peripheral Smear for Malarial Parasites	
PT, APTT INR	
BT / CT	
QBC	
CRP	
IgM Dengue	
Widal	
MSAT	
Viral Markers for Hepatitis	
NEC	
HIV	
Urine Routine	
Urine Culture & Sensitivity	
Urine for Bile Salts & Bile Pigments	
Urine for RBC	
Stool for Ovacyst	
Stool for Occult Blood	

CSF Examination - Cell Count - Protein Sugar - AFB - Gram Staining - Culture Sensitivity - Viral Markers	
Bone Marrow Aspiration	
CT Scan	
MRI	

Bedside ECHO Cardiogram with Doppler :

12 Lead ECG :

Bedside Chest X-Ray :

Expert Opinion if any :

Admission to PICU :

Transfer out from PICU :

Duration of PICU Stay :

Outcome : Survivor / Non Survivor

INFORMATION SHEET FOR THOSE WHO PLAN TO PARTICIPATE IN THE RESEARCH PROJECT

NAME OF THE RESEARCH PROJECT
ASSESSMENT OF MYOCARDIAL STATUS IN CRITICALLY ILL CHILDREN ADMITTED IN PICU- A PROSPECTIVE OBSERVATIONAL STUDY

We welcome you and thank you for having accepted our request to consider whether your child can participate in our study. This sheet contains the details of the study; the possible risks, discomfort and benefits for the participants are also given.

You can read and understand by yourself; if you wish we are ready to read and explain the same to you.

If you do not understand on the details of study or if you wish for further details we are ready to provide the details.

Information to the participants

What is the purpose of the study?
To assess the myocardial status in critically ill children admitted in PICU of Stanley medical college

Who/where is the study is being conducted?
PICU, Institute of Social Paediatrics, Stanley Medical College

Why our child is being considered as one of the participant?
Your child has been considered as the participant as he/she is the person who is fulfilling the criteria of inclusion&exclusion

Should our child definitely has to take part in the study?
No.if you do not wish your child to participate,your child will not be included in the study.in addition your child will continue to get the medical treatment without any prejudice.

If my child is participating in the study,what are my responsibilities?
Your responsibilities are
1.to allow us perform blood investigations(2 ml of blood will be drawn)
2.to co-operate while performing the test
3.to answer reliably when asked for
4.to inform if your child has any discomfort during the study period

Are there any benefits for our child/public?
Yes

Will there be any discomfort/risks to my child?
There is no risk or discomfort involved in the study

Will I be paid for the study?
No.you will not be paid.

Will our child's participation in this study,our child's personal details will be kept confidentially?
Yes,confidentiality will be maintained

Will I be informed of this study's results and findings?
Yes,if you want you can get the details from us.

Can I withdraw my child from this study at any time during the study period?
Yes, you can withdraw your child at any time during the study period.

CONSENT FORM

I _____ have been informed about the details of the study in own language.

I have understood the details about the study.

I know the possible risks and benefits for me/Son / daughter, by taking part in the study.

I understand that we can withdraw from the study at any point of time and even then, I will continue to get the medical treatment as usual.

I understand that I will not get any payment for taking part in this study.

I will not object if the results of this study are getting published in any medical journals, provided my personal identity is not reviewed.

I know what I am supposed to do by taking part in this study and I assure that I will give my full co-operation for this study.

I nominate ----------(name) (mention the relation) to be my dependant to receive compensation if any.

Signature/Thumb impression of the participant

(Name/Address/Occupation/Monthly income)

_____

_____

_____

Signature/Thumb impression of the witness (Name/Address)

_____

_____

_____

Name & Signature of the investigator

_____

ஆராய்ச்சி தகவல் தாள்

ஆராய்ச்சி தலைப்பு :

குழந்தைகள் தீவிர சிகிச்சை பிரிவில் அனுமதிக்கப்பட்டிருக்கும் குழந்தைகளின் இருதய பாதிப்பை ட்ரோபோனின்-T, எக்கோ, இ.சி.ஜி. எக்ஸ்ரே ஆகியவற்றின் மூலம் கண்டு அறிவதற்கான ஆய்வு.

ஸ்டேன்லி அரசு மருத்துவமனையில் தீவிர சிகிச்சை பிரிவில் அனுமதிக்கப்பட்டிருக்கும் குழந்தைகளின் இருதய பாதிப்பை கண்டறிவதற்காக ட்ரோபோனின்-T, எக்கோ, இ.சி.ஜி. எக்ஸ்ரே ஆகியவற்றின் மூலம் அறிவதற்கான ஆராய்ச்சி நடைபெறுகிறது.

ஆராய்ச்சியின் நோக்கம் மற்றும் பயன்களும்:

தீவிர சிகிச்சைப் பிரிவில் சிகிச்சை பெறும் குழந்தைகளுக்கு பல்வேறு காரணங்களால் இருதய பாதிப்பு ஏற்பட வாய்ப்புள்ளது. இதனை இரத்தப் பரிசோதனையான ட்ரோபோனின்-T, எக்கோ, இ.சி.ஜி. எக்ஸ்ரே ஆகியவற்றின் மூலமாக விரைவாகவும், துல்லியமாகவும் கண்டறியக்கூடிய ஆராய்ச்சி மேற்கொள்ளப்பட இருக்கிறது. இதன் மூலம் எந்த அளவிற்கு குழந்தைகளுக்கு இருதயம் பாதிப்பு ஏற்பட்டிருக்கிறது என்பதான ஆய்வு மேற்கொள்ளப்படுகிறது. உங்கள் குழந்தையின் பங்கேற்பு திட்டமிடப்பட்டுள்ள இந்த ஆராய்ச்சியே ஆய்வின் நோக்கமாகும்.

ஆய்வு நடைமுறைகள்:

ஸ்டேன்லி குழந்தைகள் நல மருத்துவமனையில் உள்நோயாளிகள் பிரிவில் தீவிர சிகிச்சை பிரிவில் இருக்கும் ஒரு மாதம் முதல் 12 வயது வரை உள்ள உடல் நலம் மிகவும் பாதிக்கப்பட்டுள்ள குழந்தைகள் இந்த ஆராய்ச்சிக்கு தகுதியானவர்கள்.

அந்தரங்கத் தன்மை:

உங்கள் குழந்தையின் மருத்துவப் பதிவேடுகள் மிகவும் அந்தரங்கமாக வைத்துக்கொள்ளப்படும் மற்றும் இன்னபிற மருத்துவர்கள், விஞ்ஞானிகள் இந்த ஆய்வின் தணிக்கையாளர்கள் அல்லது ஆராய்ச்சி ஆதரவாளர்களின் பிரதிநிதிகள், ஆகியோரிடமும் அவை வெளிப்படுத்தப்படும். இந்த ஆய்வின் முடிவுகள்

பெயரை வெளியிடுவதன் மூலம் நோயாளிகள் அடையாளம் காட்டப்பட மாட்டார்கள்.

ஆய்வில் உங்கள் பங்கேற்பு மற்றும் உங்கள் உரிமைகள்:

இந்த ஆய்வில் உங்கள் குழந்தையின் பங்கேற்பு முழுவதும் உங்களுடைய விருப்பத்தை சார்ந்தது. இதில் நீங்கள் பங்கேற்க மறுக்கவோ, பாதியில் வெளியேறி விடவோ, அல்லது குறிப்பிட்ட கேள்விகளுக்கு விடையளிக்க மறுக்கவோ உங்களுக்கு முழு உரிமை உண்டு. எப்படி இருந்தாலும் உங்கள் குழந்தையின் உடல்நிலைக்கேற்ப அவருக்கு பொருத்தமான சிகிச்சை தொடர்ந்து அளிக்கப்படும். தாங்கள் இது குறித்து வேறு விவரங்கள் தெரிந்துக்கொள்ள விரும்பினால் எங்களிடம் கேட்டு தெரிந்துக்கொள்ளலாம்.

முடிவுகளை அல்லது கருத்துக்களை வெளியிடும் போதோ அல்லது ஆராய்ச்சியின் போதோ தங்களது குழந்தையின் பெயரையோ அல்லது அடையாளங்களையோ வெளியிடமாட்டோம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியில் பங்கேற்பது தங்களுடைய விருப்பத்தின் பேரில் தான் இருக்கிறது. மேலும் நீங்கள் எந்நேரமும் இந்த ஆராய்ச்சியிலிருந்து பின்வாங்கலாம் என்பதையும் தெரிவித்துக்கொள்கிறோம்.

இந்த சிறப்பு சிகிச்சையின் முடிவுகளை ஆராய்ச்சியின் போதோ அல்லது ஆராய்ச்சியின் முடிவின் போதோ தங்களுக்கு அறிவிக்கப்படும் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

மேலும் விபரம் அறிய கீழ்கண்ட நபரை அணுகவும்.
மருத்துவர். வே. ஷர்மிளா - 9894098086

ஆராய்ச்சியாளர் கையொப்பம் **பங்கேற்பாளர் கையொப்பம்**

நாள் :
இடம் :

ஆராய்ச்சி ஒப்புதல் கடிதம்

ஆராய்ச்சி தலைப்பு :

குழந்தைகள் தீவிர சிகிச்சை பிரிவில் அனுமதிக்கப்பட்டிருக்கும் குழந்தைகளின் இருதய பாதிப்பை ட்ரோபோனின்-T, எக்கோ, இ.சி.ஜி. எக்ஸ்ரே ஆகியவற்றின் மூலம் கண்டு அறிவதற்கான ஆய்வு.

ஸ்டேன்லி அரசு மருத்துவமனையில் தீவிர சிகிச்சை பிரிவில் அனுமதிக்கப்பட்டிருக்கும் குழந்தைகளின் இருதய பாதிப்பை கண்டறிவதற்காக ட்ரோபோனின்-T, எக்கோ, இ.சி.ஜி. எக்ஸ்ரே ஆகியவற்றின் மூலம் அறிவதற்கான ஆய்வு.

பெயர் : **தேதி :**
வயது : **உள்நோயாளி எண் :**
பால் : **ஆராய்ச்சி சேர்க்கை எண்:**
பெற்றோர் பெயர் மற்றும் முகவரி :

இந்த ஆராய்ச்சியின் விவரங்களும் அதன் நோக்கமும் முழுமையாக எனக்கு தெளிவாக விளக்கப்பட்டது.

எனக்கு விளக்கப்பட்ட விஷயங்களை நான் புரிந்துக் கொண்டு எனது சம்மதத்தை தெரிவிக்கிறேன்.

இந்த ஆராய்ச்சியில் பிறரின் நிர்பந்தமின்றி எந்த சொந்த விருப்பத்தின் பேரில் நான் எனது குழந்தையை பங்குபெற சம்மதிக்கிறேன் மற்றும் நான் இந்த ஆராய்ச்சியில் இருந்து எந்நேரமும் பின் வாங்கலாம் என்பதையும் அதனால் எந்த பாதிப்பும் ஏற்படாது என்பதையும் நான் புரிந்துக் கொண்டேன்.

இந்த ஆராய்ச்சியினால் ஏற்படும் நன்மைகளையும், சில பக்க விளைவுகளையும் பற்றி தெளிவாக மருத்துவர் மூலம் தெரிந்து கொண்டேன்.

நான் என்னுடைய சுயநினைவுடன் மற்றும் முழு சுதந்திரத்துடன் இந்த மருத்துவ ஆராய்ச்சியில் என்னுடைய குழந்தையை சேர்த்துக் கொள்ள சம்மதிக்கிறேன்.

ஆராய்ச்சியாளர் கையொப்பம் **பங்கேற்பாளர் கையொப்பம்**

நாள் :
இடம் :

MASTER CHART

S. NO.	NAME	AGE	SEX	COMPLAINTS	PROVISIONAL DIAGNOSIS	FINAL DIAGNOSIS	VOLUME RESUSCITATION	IONOTROPIC SUPPORT	VENTI LATION	SHOCK CORRECTED/NOT	DURATION OF PICU STAY	TREATMENT-MEDICAL / SURGICAL	SERUM TROPONIN T(ECLIA)	RESULTS	ECHO CARDIOGRAM	12 LEAD ECG	CHEST XRAY	OUTCOME-SURVIVOR / NON-SURVIVOR
1	B/O SABITHA	1 MONTH	MCH	COUGH,BREATHLESSNESS	BRONCHOPNEUMONIA	BRONCHOPNEUMONIA,CULTURE POSITIVE SEPSIS,CIRCULATORY SHOCK	YES	YES1	NO	YES	17 DAYS	MEDICAL	0.08	NORMAL	NORMAL STUDY	TACHYCARDIA	ABNORMAL	SURVIVOR
2	ABBAS	5 MONTHS	MCH	COUGH,BREATHLESSNESS	BRONCHOPNEUMONIA	BRONCHOPNEUMONIA,CULTURE POSITIVE SEPSIS,CIRCULATORY SHOCK	YES	YES1,2,3	YES	NO	13 DAYS	MEDICAL	0.8	POSITIVE	NORMAL STUDY	TACHYCARDIA	ABNORMAL	NON-SURVIVOR
3	JOHN DHAYA	4 MONTHS	MCH	LETHARGY,CONSTIPATION ,SUDDEN UNRESPONSIVENESS	CONGENITAL HYPOTHYROIDISM	CONGENITAL HYPOTHYROIDISM,THYROID DYSGENESIS	NO	NO	NO	NO	15 DAYS	MEDICAL	0.13	POSITIVE	PERICARDIAL EFFUSION WITH PULMONARY STENOSIS	LOWVOLTAGE COMPLEXES	ABNORMAL	SURVIVOR
4	DHARSHINI	9 MONTHS	FCH	COUGH BREATHLESSNESS	BRONCHOPNEUMONIA	PYOTHORAX	YES	YES 1	YES	YES	34 DAYS	MEDICAL/ICD	0.45	POSITIVE	LVEF DECREASED	TACHYCARDIA, T WAVE DEPRESSION	ABNORMAL	NON-SURVIVIOR
5	DINESH	10 YEARS	MCH	CONTACT WITH ELECTRICAL SOURCE ,CONVULSIONS	ELECTROCUTION WITH STATUS EPILEPTICUS	ELECTROCUTION WITH STATUS EPILEPTICUS,ASPIRATION PNEUMONITIS	NIL	YES 1	YES	YES	7 DAYS	MEDICAL	0.003	NORMAL	NORMAL STUDY	TACHYCARDIA	ABNORMAL	SURVIVOR
6	ANUSHKA	8 YEARS	FCH	SCORPON STING	SCORPION ENVENOMATION	SCORPION ENVENOMATION WITH CARDIOGENIC SHOCK	YES	YES2	YES	YES	4 DAYS	MEDICAL	0.631	POSITIVE	LVEF DECREASED	TACHYCARDIA	NORMAL	SURVIVOR
7	KANGAIYAN	4 MONTHS	MCH	CONVULSIONS	ACUTE CNS INFECTION	ACUTE CNS INFECTION	YES	YES1	NO	YES	3 DAYS	MEDICAL	0.02	NORMAL	NORMAL STUDY	TACHCARDIA	NORMAL	SURVIVOR
8	SELVA	18 MONTHS	MCH	BREATHLESSNESS	NEAR FATAL ASTHMA	NEAR FATAL ASTHMA	NO	YES	YES	YES	9 DAYS	MEDICAL	0.011	NORMAL	NORMAL STUDY	WNL	HYPERINFLATION	SURVIVOR
9	MOUVANTHIKA	3MONTHS	FCH	BREATHLESSNESS,REFUSAL OF FEEDS	LOS/BRONCHOPNEUMONIA	LATE ONSET SEPSIS/SEPTIC SHOCK/BRONCHOPNEUMONIA	YES	YES4	YES	YES	9 DAYS	MEDICAL	0.15	POSITIVE	NORMAL STUDY	TACHYCARDIA	ABNORMAL	SURVIVOR
10	POOJA	2 YEARS 6 MONTHS	FCH	FEVER,BREATHLESSNESS	GLOBAL DEVELOPMENTAL DELAY/SEIZURE DISORDER/ASPIRATION PNEUMONITIS GDD/ASPIRATION PNEUMONIA/SEIZURE DISORDER/CULTURE POSITIVE SEPSIS		YES	YES1	YES	YES	2 MONTHS	MEDICAL	0.005	NORMAL	NORMAL STUDY	WNL	ABNORMAL	SURVIVOR
11	SABARISHWARAN	2 MONTHS	MCH	BREATHLESSNESS,REFUSAL OF FEEDS	CLEFT LIP/CLEFT PALATE/LOS/DUODENAL PERFORATION	CLEFT LIP/CLEFT PALATE/DUODENAL PERFORATION/LOS/PERSISTENT HYPOGLYCEMIA	YES	YES1	YES	YES	15 DAYS	MEDICAL/SURGICAL	0.22	POSITIVE	NORMAL STUDY	TACHYCARDIA	NORMAL	NONSURVIVOR
12	GOWTHAM	2 MONTHS	MCH	BREATHLESSNESS	BRONCHOPNEUMONIA	RIGHT U/L COLLAPSE WITH CONSOLIDATION	YES	YES3	YES	YES	15 DAYS	MEDICAL	0.05	NORMAL	NORMAL STUDY	WNL	ABNORMAL	SURVIVOR
13	GOPINATH	2 YEARS	MCH	ALTERED SENSORIUM,CONVULSIONS	ACUTE CNS INFECTION /STATUS EPILEPTICUS	ACUTE CNS INFECTION/STATUS EPILEPTICUS	YES	YES1,3	YES	YES	4 DAYS	MEDICAL	0.25	POSITIVE	LVEF DECREASED	TACHYCARDIA	ABNORMAL	NONSURVIVOR
14	JEEVITHA	4 MONTHS	FCH	COUGH,BREATHLESSNESS, FEVER	BRONCHOPNEUMONIA	BRONCHOPNEUMONIA/FTT/ DIVC/SEPTIC SHOCK	YES	YES1,3,4	YES	NO	3 DAYS	MEDICAL	0.36	POSITIVE	LVEF DECREASED	TACHYCARDIA, T WAVE DEPRESSION	ABNORMAL	NONSURVIVOR
15	SIVAGAMI	6 YEARS 6MONTHS	FCH	BREATHLESSNESS,FEVER	GDD/SPASTIC CP/SEIZURE DISORDER/ASPIRATION PNEUMONIA	GDD/SPASTIC CP/SEIZURE DISORDER/ASPIRATION PNEUMONIA	YES	YES1,3	YES	YES	2 DAYS	MEDICAL	0.O7	NORMAL	NORMAL STUDY	TACHYCARDIA	ABNORMAL	NONSURVIVOR
16	SUGANYA	4 MONTHS	FCH	BREATHLESSNESS,FEVER	BRONCHOPNEUMONIA	BRONCHOPNEUMONIA	YES	YES1	YES	YES	12 DAYS	MEDICAL	0.04	NORMAL	NORMAL STUDY	WNL	ABNORMAL	SURVIVOR
17	SARAN	3 YEARS	MCH	FEVER,BREATHLESSNESS	SEPSIS WITH SHOCK	RIGHT EMPYEMA,SEVERE SEPSIS,SEPTIC SHOCK,MODS,RESPIRATORY FAILURE	YES	YES1,2,3	YES	NO	1 DAY	MEDICAL	0.52	POSITIVE	LVEF DECREASED	TACHYCARDIA	ABNORMAL	NON-SURVIVOR
18	SANTHOSH	11 YEARS	MCH	HANGING,ALTEREDSENSORIUM	HANGING	HANGING	YES	YES1	YES	YES	6 DAYS	MEDICAL	0.07	NORMAL	NORMAL STUDY	TACHYCARDIA	ABNORMAL	SURVIVOR

S. NO.	NAME	AGE	SEX	COMPLAINTS	PROVISIONAL DIAGNOSIS	FINAL DIAGNOSIS	VOLUME RESUSCITATION	IONOTROPIC SUPPORT	VENTI LATION	SHOCK CORRECTED/NOT	DURATION OF PICU STAY	TREATMENT-MEDICAL / SURGICAL	SERUM TROPONIN T(ECLIA)	RESULTS	ECHO CARDIOGRAM	12 LEAD ECG	CHEST XRAY	OUTCOME-SURVIVOR / NON-SURVIVOR
19	SARANYA	10 YEARS	FCH	ALTERED SENSORIUM,CONVULSIONS	SEIZURE DISORDER,PACHYGYRIA, ASPIRATION PNEUMONITIS	SEIZURE DISORER,PACHYGYRIA,ASPIRATION PNEUMONITIS	YES	YES1,3	YES	YES	27 DAYS	MEDICAL	0.064	NORMAL	NORMAL STUDY	TACHYCARDIA	ABNORMAL	SURVIVOR
20	SAKTHI	9 YEARS	FCH	ALTERED SENSORIUM	ACUTE ENCEPHALITIS,STATUS EPILEPTICUS,MODS/DIVC/REFRACTORY SHOCK	ACUTE ENCEPHALITIS/STATUS EPILEPTICUS/MODS/DIVC/REFRACTORY SHOCK	YES	YES1,2,3	YES	NO	3 DAYS	MEDICAL	0.35	POSITIVE	NORMAL STUDY	TACHYCARDIA	ABNORMAL	NONSURVIVOR
21	SANJAY	12 YEARS	MCH	BREATHLESSNESS	STATUS ASTHMATICUS	STATUS ASTHMATICUS/NEAR FATAL ASTHMA	NO	YES1	YES	NA	6 DAYS	MEDICAL	0.003	NORMAL	NORMAL STUDY	WNL	HYPERINFLATION	SURVIVOR
22	AMSA	5 MONTHS	FCH	NON SURVIVOR	IEM/UREA CYCLE DISORDER/STATUS EPILEPTICUS/SEPSIS	IEM/UREA CYCLE DISORDER/STATUS EPILEPTICUS/SEPSIS	YES	YES1,3	YES	NO	2 DAYS	MEDICAL	0.7	POSITIVE	LVEF DECREASED	TACHYCARDIA	NORMAL	NONSURVIVOR
23	LASHYA	4 MONTHS	FCH	BREATHLESSNESS/ABNORMAL BREATHING SOUND	BRONCHOPNEUMONIA,LARYNGOMALACIA	BRONCHOPNEUMONIA,LARYNGOMALACIA	NO	NO	YES	NA	6 DAYS	MEDICAL	0.007	NORMAL	NORMAL STUDY	WNL	BRONCHOPNEUMONIA	SURVIVOR
24	PUGALINIYAN	2 YEARS 6 MONTHS	MCH	BREATHLESSNESS,FEVER,REFUSAL OF FEEDS	BRONCHOPNEUMONIA ,SEPTIC SHOCK	BRONCHOPNEUMONIA,SEPTIC SHOCK	YES	YES1,3	YES	YES	17 DAYS	MEDICAL	0.32	POSITIVE	NORMAL STUDY	WNL	BRONCHOPNEUMONIA	SURVIVOR
25	KAVIN	1 YEAR	MCH	COUGH,FEVER	BRONCHOPNEUMONIA	BRONCHOPNEUMONIA	YES	YES 1	NO	YES	8 DAYS	MEDICAL	0.005	NORMAL	NORMAL STUDY	WNL	BRONCHOPNEUMONIA	SURVIVOR
26	ROHITH	36 DAYS	MCH	LOOSESTOOLS,LETHARGY	ADD SEVERE DEHYDRATION,	ADD SEVERE DEHYDRATION,SEPTIC CARDIOGENIC SHOCK	YES	YES1,3	YES	NO	2 HRS	MEDICAL	0.44	POSITIVE	LVEF DECREASED	TACHYCARDIA	NORMAL	NONSURVIVOR
27	RAHINI	36 DAYS	FCH	LOOSESTOOLS,VOMITING, FAILURE TO GAIN WEIGHT	ADD SEVERE DEHYDRATION,FTT	ADD SEVERE DEHYDRATION,FTT	YES	NO	NO	NO	5 DAYS	MEDICAL	0.007	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
28	SAIMITHRAN	2 YEARS 6 MONTHS	MCH	LETHARGY,CONVULSIONS	ACUTE CNS INFECTION	DEMYELINATING DISEASE	YES	YES 1,3	YES	NO	16 DAYS	MEDICAL	0.008	NORMAL	NORMAL STUDY	NORMAL	NORMAL	NON-SURVIVOR
29	KISHORE	2 YEARS	MCH	SALICYLATE CONSUMPTION	SALICYLATE POISONING	SALICYLATE POISONING	NO	NO	NO	NA	2 DAYS	MEDICAL	0.006	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
30	VIJAYSHREE	1 MONTH	FCH	VOMITING,ABDOMINAL DISTENSION	LOS	LOS	NO	NO	NO	NA	2 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
31	KAVYA	2 YEARS	FCH	BREATHLESSNESS	WALRI	WALRI	NO	NO	NO	NA	2 DAYS	MEDICAL	0.005	NORMAL	NORMAL STUDY	NORMAL	HYPERINFLATION	SURVIVOR
32	PIYUSH KUMAR	10 YEARS	MCH	OPC CONSUMPTION	OPC POISONING	OPC POISONING	NO	NO	NO	NA	2 DAYS	MEDICAL	0.008	NORMAL	NORMAL STUDY	TACHYCARDIA	NORMAL	SURVIVOR
33	SUDHASRI	7 YEARS	FCH	SEIZURES	MYOCLONIC SEIZURES	MYOCLONIC SEIZURES	NO	NO	NO	NA	4 DAYS	MEDICAL	0.004	NORMAL	NORMAL STUDY	WNL	NORMAL	SURVIVOR
34	KAJAL KUMARI	4 YEARS	FCH	LOOSE STOOLS	ADD SEVERE DEHYDRATION	ADD SEVERE DEHYDRATION	YES	NO	NO	NA	3 DAYS	MEDICAL	0.007	NORMAL	NORMAL STUDY	WNL	NORMAL	SURVIVOR
35	SANJANA	9 YEARS	FCH	FEVER	FEVER WITH THROMBOCYTOPENIA	HLH	YES	YES1	NO	NA	9 DAYS	MEDICAL	0.008	NORMAL	NORMAL STUDY	WNL	NORMAL	SURVIVOR
36	RIDHU VARSHINI	1 YEAR 6 MONTHSFCH		KEROSENE INGESTION	KEROSENE INGESTION	KEROSENE INGESTION	NO	NO	NO	NA	2 DAYS	MEDICAL	0.006	NORMAL	NORMAL STUDY	WNL	NORMAL	SURVIVOR
37	LIKESH	1 YEAR 6 MONTHSFCH	MCH	BREATHLESSNESS	BRONCHOPNEUMONIA SEPTIC SHOCK	BRONCHOPNEMONIA SEPTIC SHOCK	YES	YES 4	YES	YES	5 DAYS	MEDICAL	0.005	NORMAL	NORMAL STUDY	WNL	NORMAL	SURVIVOR
38	RITHIKA SRI	4 YEARS	FCH	LOOSESTOOLS	ADD SEVERE DEHYDRATION FTT	ADD SEVERE DEHYDRATION FTT	YES	NO	NO	NA	6 DAYS	MEDICAL	0.009	NORMAL	NORMAL STUDY	WNL	NORMAL	SURVIVOR
39	VISHWA	8 YEARS	MCH	NEAR DROWNING RESPIRATORY DISTRESS	NEAR DROWNING	FRESH WATER NEAR DROWNING	NO	NO	NO	NA	4 DAYS	MEDICAL	0.007	NORMAL	NORMAL STUDY	TACHYCARDIA	ABNORMAL	SURVIVOR
40	SAMPOORNAM	29 DAYS	FCH	VOMITING,ABDOMINAL DISTENSION	LOS	LOS,SEPTIC ILEUS	YES	NO	NO	NA	7 DAYS	MEDICAL	0.009	NORMAL	NORMAL STUDY	WNL	NORMAL	SURVIVOR
41	KARTHI	7 YEARS	MCH	ALTERED SENSORIUM,SEIZURES	ACUTE CNS INFECTION	SUPER REFRACTORY SEIZURES,ACUTE CNS INFECTION	YES	YES1	YES	YES	1 MONTH 5 DAYS	MEDICAL	0.4	POSITIVE	NORMAL STUDY	TACHYCARDIA	VAP	NONSURVIVOR
42	KALPANA	3 YEARS	FCH	FEVER,ALTERED SENSORIUM	ACUTE CNS INFECTION	ACUTE CNS INFECTION	YES	YES1	NO	YES	5 DAYS	MEDICAL	0.009	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
43	KARTHIK	10 YEARS	MCH	BREATHLESSNESS,INCREASED URINE OUTPUT	DKA	DKA	YES	NO	NO	NA	7 DAYS	MEDICAL	0.005	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
44	NAVEENKUMAR	12 YEARS	MCH	JAUNDICE	WILSON'S DISEASE	WILSON'S DISEASE	NO	NO	NO	NA	16 DAYS	MEDICAL	0.003	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR

S. NO.	NAME	AGE	SEX	COMPLAINTS	PROVISIONAL DIAGNOSIS	FINAL DIAGNOSIS	VOLUME RESUSCITATION	IONOTROPIC SUPPORT	VENTI LATION	SHOCK CORRECTED/NOT	DURATION OF PICU STAY	TREATMENT-MEDICAL / SURGICAL	SERUM TROPONIN T(ECLIA)	RESULTS	ECHO CARDIOGRAM	12 LEAD ECG	CHEST XRAY	OUTCOME-SURVIVOR / NON-SURVIVOR
45	DINESH KUMAR	6 YEARS	MCH	CONVULSIONS	STATUS EPILEPTICUS	POST MENINGITIC SEQUELAE,STATUS EPILEPTICUS,GLOBAL DEVELOPMENTAL DELAY ASPIRATION PNEUMONITIS	YES	YES 1,3	YES	NO	2 DAYS	MEDICAL	0.007	NORMAL	NORMAL STUDY	NORMAL	ASPIRATON PNEUMONITIS	NON SURVIVOR
46	CHARULATHA	10 MONTHS	FCH	BREATHLESSNESS,COUGH, COLD	BRONCHOPNEUMONIA	BRONCHOPNEUMONIA	YES	YES1,4	YES	YES	9 DAYS	MEDICAL	0.13	POSITIVE	LVEF DECREASED	T WAVE INVERSION	RIGHT UPPER LOBE COLLAPSE	NONSURVIVOR
47	NARESH	9 MONTHS	MCH	BREATHLESSNESS,FEVER	BROCHOPNEUMONIA	BRONCHOPNEUMONIA,PNEUMOTHORAX	YES	YES 4	YES	YES	6 DAYS	MEDICAL	0.33	POSITIVE	NORMAL STUDY	NORMAL	PNEUMOTHORAX	NONSURVIVOR
48	B/O JAYALAKSHMI	1 MONTH	MCH	BREATHLESSNESS,FEVER	RIGHT UPPER LOBE COLLAPSE	RIGHT UPPER LOBE COLLAPSE	NO	NO	YES	NA	5 DAYS	MEDICAL	0.08	NORMAL	NORMAL STUDY	NORMAL	RIGHT UPPER LOBE COLLAPSE	SURVIVOR
49	SATYASEELAN	5 YEARS	MCH	BREATHLESSNESS,FEVER	MYOCARDITIS,CARDIOGENIC SHOCK	ACUTE MYOCARDITIS,REFRACTORY HYPOTENSIVE SHOCK	YES	YES3	YES	NO	1 DAY	MEDICAL	0.45	POSITIVE	LVEF 30%	T WAVE INVERSION	NORMAL	NONSURVIVOR
50	CHARULATHA	11 YEARS	FCH	SNAKEBITE	SNAKEBITE	SNAKE BITE ENVENOMATION	NO	YES 1	YES	YES	2 DAYS	MEDICAL	0.003	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
51	THASHWANTH	2 YEARS	MCH	BREATHLESSNESS,FEVER	BRONCHOPNEUMONIA	SEVERE BRONCHOPNEUMONIA	NO	YES 1	NA	YES	7 DAYS	MEDICAL	0.007	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
52	SUDHANSRI	9 MONTHS	MCH	CONVULSIONS	STATUS EPILEPTICUS	MYOCLONIC SEIZURES	NO	YES 1	NA	YES	8 DAYS	MEDICAL	0.004	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
53	ASHWIN	2 YEARS 6 MONTHS	MCH	BREATHLESSNESS	BRONCHIOLITIS	SEVERE BRONCHIOLITIS	YES	YES 1,3	NO	YES	5 DAYS	MEDICAL	0.9	POSITIVE	NORMAL STUDY	NORMAL	NORMAL	NON SURVIVOR
54	B/O BHARATHY	2 MONTHS	MCH	BREATHLESSNESS	BRONCHIOLITIS	BRONCHIOLITIS	NO	YES 1	NA	YES	5 DAYS	MEDICAL	0.007	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
55	GANGOTHRI	1 MONTH	FCH	BREATHLESSNESS,FEVER	BRONCHOPNEUMONIA	BRONCHOPNEUMONIA	YES	YES 1	YES	YES	7 DAYS	MEDICAL	0.006	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
56	SABAREESH	10 YEARS	MCH	CONVULSIONS	STATUS EPILEPTICUS	GLOBAL DEVELOPMENTAL DELAY/VP SHUNT FAILURE//CONGENITAL HYDROCEPHALUS	YES	YES 1	YES	YES	5 DAYS	MEDICAL	0.009	NORMAL	NORMAL STUDY	NORMAL	NORMAL	NON SURVIVOR
57	KAVESH	2 YEARS	MCH	CONVULSIONS	ACUTE CNS INFECTION	ACUTE CNS INFECTION	NO	YES 1	YES	YES	4 DAYS	MEDICAL	0.008	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
58	EZHUMALAI	11 YEARS	MCH	COUGH,BREATHLESSNESS, FEVER	BRONCHOPNEUMONIA	MR/MPS/HUNTER/BRONCHOPNEUMONIA/PSEUDOMANAS POSITIVE SEPSIS	YES	YES 1	YES	YES	18 DAYS	MEDICAL	0.32	POSITIVE	NORMAL STUDY	NORMAL	BRONCHOPNEUMONIA	NONSURVIVOR
59	KIRAN KARTHIK	5 YEARS	MCH	RTA RIGHT THIGH INJURY	RIGHT THIGH DEGLOVING INJURY	RIGHT THIGH DEGLOVING INJURY	YES	YES 1	YES	YES	1 MONTH	SURGICAL	0.72	POSITIVE	NORMAL STUDY	T WAVE INVERSION	NORMAL	NONSURVIVOR
60	MADHAVAN	1 YEAR 4 MONTHS	MCH	CONVULSIONS	FEBRILE STATUS EPILETICUS/ASPIRATION PNEUMONIA	FEBRILE STATUS/ASPIRATION PNEUMONIA	YES	YES 1,3	YES	YES	4 DAYS	MEDICAL	0.54	POSITIVE	NORMAL STUDY	NORMAL	ASPIRATON PNEUMONITIS	NONSURVIVOR
61	NASREEN BANU	3 MONTHS	FCH	BREATHLESSNESS	BRONCHOPNEUMONIA	BRONCHOPNEUMONIA/SEPSIS/RESPIRATORY FAILURE/DIVC	YES	YES1,3	YES	YES	1 DAY	MEDICAL	0.87	POSITIVE	NORMAL STUDY	TACHYCARDIA, T WAVE DEPRESSION	BRONCHOPNEUMONIA	NONSURVIVOR
62	NIVETHA	1 YEAR 6 MONTHS	FCH	CONVULSIONS	GDD/SEIZURE DISORDER	GDD/SEIZURE DISORDER/STATUS EPILEPTICUS	YES	YES1,3	YES	YES	1 DAY	MEDICAL	0.009	NORMAL	NORMAL STUDY	NORMAL	NORMAL	NONSURVIVOR
63	ISHWARYA	8 YEARS	FCH	BREATHLESSNESS	GDD/SPASTIC CP/SEIZURE DISORDER/ASPIRATION PNEUMONIA	GDD/SPASTIC CP/SEIZURE DISORDER/ASPIRATION PNEUMONIA	YES	YES 1	YES	YES	6 DAYS	MEDICAL	0.07	NORMAL	NORMAL STUDY	NORMAL	ASPIRATON PNEUMONITIS	NONSURVIVOR
64	BALAVINAYAGAM	3 YEARS	MCH	WEAKNESS OF ALL LIMBS	GBS/AFP	GBS/AFP	NO	NO	YES	YES	5 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
65	OVIYAN	7 YEARS	MCH	HEAD INJURY	SUBDURAL HEMORRHAGE/POST TRAUMATIC	SUBDURAL HAEMORHHAGE/POST TRAUMATIC	YES	YES 1	YES	YES	8 DAYS	MEDICAL	0.004	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
66	SANA TABASUM	2 YEARS	FCH	CONVULSIONS	DEVELOPMENTAL DELAY/SEIZURE DISORDER/WITHDRAWAL SEIZURE	DEVELOPMENTAL DELAY/SEIZURE DISORDER/WITHDRAWAL SEIZURE	NO	NO	YES	NA	1 DAY	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR

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67	SANTHOSH	10 YEARS	MCH	CONVULSIONS	ACUTE CNS INFECTION/VIRAL ENCEPHALITIS/REFRACTORY HYPOTENSIVE SHOCK	ACUTE CNS INFECTION/VIRAL ENCEPHALITIS/REFRACTORY HYPOTENSIVE SHOCK	YES	YES 1,3	YES	NO	4 DAYS	MEDICAL	0.024	NORMAL	NORMAL STUDY	NORMAL	NORMAL	NONSURVIVOR
68	ANU	46 DAYS	FCH	BREATHLESSNESS/COUGH	LOS/ASPIRATION PNEUMONIA/REFRACTORY HYPOTENSIVE SHOCK	LOS/ASPIRATION PNEUMONIA/REFRACTORY HYPOTENSIVE SHOCK	YES	YES1,3	YES	NO	1 DAY	MEDICAL	0.08	NORMAL	NORMAL STUDY	TACHYCARDIA, ST ELEVATION	ASPIRATON PNEUMONITIS	NON SURVIVOR
69	MATHIVANI	3 YEARS 6 MONTHS	FCH	CONVULSIONS	ACUTE CNS INFECTION/BRONCHOPNEUMONIA	ACUTE CNS INFECTION/BRONCHOPNEUMONIA	YES	YES 1	YES	YES	2 DAYS	MEDICAL	0.66	POSITIVE	NORMAL STUDY	NORMAL	BRONCHOPNEUMONIA	SURVIVOR
70	B/O SUJA	2 YEARS 6 MONTHS	FCH	LOOSE STOOLS	FLOPPY INFANT/ADD WITH SEVERE DEHYDRATION/RENAL FAILURE/HYPOTHYROIDISM	FLOPPY INFANT/ADD WITH SEVERE DEHYDRATION/RENAL FAILURE/HYPOTHYROIDISM	YES	YES 1	YES	YES	7 DAYS	MEDICAL	0.007	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
71	MUSKAN FATHIMA	6 MONTHS	FCH	CONVULSIONS	ACUTE CNS INFECTION	ACUTE CNS INFECTION	NO	YES 1	YES	NA	16 DAYS	MEDICAL	0.009	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
72	CHAARUMATHI	2 YEARS	FCH	CONVULSIONS	STURGEWEBER SYNDROME/DEVELOPMENTAL DELAY/SEIZURE DISORDER	STURGE WEBER SYNDROME/DEVELOPMENTAL DELAY/SEIZURE DISORDER	NO	NO	YES	NA	4 DAYS	MEDICAL	0.007	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
73	KANISHKA	2 YEARS 6 MONTHSFCH		DROWSINESS ?DRUG POISONING	CARBAMAZEPINE POISONIG	CARBAMAZEPINE POISONING	NO	YES1	NO	NA	2 DAYS	MEDICAL	0.005	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
74	MOHANAPRIYA	2 YEARS 6 MONTHS	FCH	CONVULSIONS	DEVELOPMENTAL DELAY/STATUS EPILEPTICUS/BRONCHOPNEUMONIA	DEVELOPMENTAL DELAY/STATUS EPILEPTICUS/BRONCHOPNEUMONIA	NO	YES 1	NO	NA	4 DAYS	MEDICAL	0.003	NORMAL	NORMAL STUDY	NORMAL	BRONCHOPNEUMONIA	SURVIVOR
75	B/O SANGEETHA	2 MONTHS	FCH	BREATHLESSNESS/REFUSAL OF FEEDS	LOS/BRONCHOPNEUMONIA/SUBGLOTTIC STENOSIS	LOS/BRONCHO PNEUMONIA/SUBGLOTTIC STENOSIS	NO	YES 1	NO	NA	2DAYS	MEDICAL	0.09	NORMAL	NORMAL STUDY	NORMAL	BRONCHOPNEUMONIA	SURVIVOR
76	NASREEN	9 MONTHS	MCH	FEVER/CONVULSIONS	ACUTE CNS INFECTION	ACUTE CNS INFECTION	NO	NO	NO	NA	3 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
77	CALAB	44 DAYS	MCH	BREATHLESSNESS	LOS/BROCHOPNEUMONIA	LOS/BRONCHO PNEUMONIA	NO	YES 1	YES	NA	6 DAYS	MEDICAL	0.003	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
78	SUBHASH CHANDRAN	11 YEARS	MCH	COUGH/FEVER/BREATHLESSNESS/SPASTIC CEREBRAL PALSY	SPASTIC CP/HYPOTENSIVE SHOCK/BRONCHOPNEUMONIA	SPASTIC CP/HYPOTENSIVE SHOCK/BRONCHOPNEUMONIA	YES	YES 1,3	YES	YES	8 DAYS	MEDICAL	0.66	POSITIVE	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
79	GOPINATH	2 YEARS	MCH	FEVER/CONVULSIONS	ACUTE CNS INFECTION/STATUS EPILEPTICUS/SHOCK	MENINGITIS/STATUS EPILEPTICUS/HYPOTENSIVE SHOCK	YES	YES 1,3	YES	YES	18 DAYS	MEDICAL	0.54	POSITIVE	NORMAL STUDY	NORMAL	NORMAL	NON SURVIVOR
80	HARIKASHREE	6 MONTHS	FCH	UNRESPONSIVENESS/CONVULSIONS	INTRACRANIAL HEMORRHAGE/LATE ONSET HDN/REFRACTORY SHOCK	ICH/LATE ONSET HDN/REFRACTORY SHOCK	YES	YES 1,3	YES	NO	6 HOURS	MEDICAL	0.009	NORMAL	NORMAL STUDY	NORMAL	NORMAL	NON SURVIVOR
81	NIRMAL KUMAR	8 MONTHS	MCH	VOMITING/REFUSAL OF FEEDS	?IEM/DEVELOPMENTAL DELAY	?INBORN ERROR OF METABOLISM/DEVELOPMENTAL DELAY/REFRACTORY SHOCK	YES	YES 1,3	YES	NO	1 HOUR	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	NON SURVIVOR
82	ANGELINE	3 MONTHS	FCH	FEVER/CONVULSIONS	ARNOLD CHIARI/HYDROCEPHALUS/MENINGOMYELOCOELE/ACUTE CNS INFECTION/SEPTIC SHOCK	ARNOLD CHIARI/HYDROCEPHALUS/MENINGOMYELOCOELE/ACTE CNS INFECTION/SEPTIC SHOCK	YES	YES 1,3	YES	YES	4 DAYS	MEDICAL	0.4	POSITIVE	NORMAL STUDY	NORMAL	NORMAL	NON SURVIVOR
83	SARAN	3 YEARS	MCH	FEVER/COUGH/HEMATEMESIS	REFRACTORY SEPTIC SHOCK/MULTIORGAN FAILURE/RIGHT EMPYEMA	REFRACTORY SEPTIC SHOCK/MULTIORGAN FAILURE/RIGHT EMPYEMA/SEVERE SEPSIS	YES	YES 1,4	YES	NO	12 HOURS	MEDICAL,SURGICAL	0.52	POSITIVE	NORMAL STUDY	NORMAL	NORMAL	NON SURVIVOR
84	AKASH	11 YEARS	MCH	ACCIDENTAL HANGING	HANGING	ACCIDENTAL HANGING	NO	YES 1	YES	NA	5 DAYS	MEDICAL	0.008	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR

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85	HEMANTH	3 YEARS	MCH	FEVER/COUGH	BROCHOPNEUMONIA/GLOBAL DEVELOPMENTAL DELAY/SEIZURE DISORDER	BRONCHOPNEUMONIA/GLOBAL DEVELOPMENTAL DELAY/SEIZURE DISORDER	YES	YES 1	YES	YES	19 DAYS	MEDICAL	0.007	NORMAL	NORMAL STUDY	NORMAL	BRONCHOPNEUMONIA	SURVIVOR
86	BHAVANA	1 YEAR	FCH	LETHARGY/REFUSAL OF FEEDS	ACUTE CNS INFECTION/IEM-TYROSINEMIA	ACUTE CNS INFECTION/IEM-TYROSINEMIA	YES	YES1,3	YES	YES	4 DAYS	MEDICAL	0.2	POSITIVE	NORMAL STUDY	NORMAL	NORMAL	NON SURVIVOR
87	JEEVANANTHAM	1 YEAR 6 MONTHSMCH		COUGH/RESPIRATORY DISTRESS	BRONCHOPNEUMONIA	BRONCHOPNEUMONIA	YES	YES 1	YES	YES	14 HOURS	MEDICAL	0.003	NORMAL	NORMAL STUDY	NORMAL	BRONCHOPNEUMONIA	NON SURVIVOR
88	DILANI	45 DAYS	MCH	BREATHLESSNESS	OESOPHAGEAL ATRESIA /GASTROSTOMY/ASPIRATION PNEUMONIA	OESOPHAGEAL ATERSIA/GASTROSTOMY/ASPIRATION PNEUMONIA	YES	YES 1,3	YES	YES	5O DAYS	MEDICAL	0.33	POSITIVE	NORMAL STUDY	NORMAL	RIGHT UPPER LOBE COLLAPSE	SURVIVOR
89	CHARMILA	7 YEARS	FCH	LETHARGY/POLYURIA	DKA	DKA	NO	NO	NO	NA	5 DAYS	MEDICAL	0.007	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
90	FATHIMA	4 YEARS	FCH	FEVER/HEMOPTYSIS/MALENA	?ACUTE LEUKEMIA/SEPTIC SHOCK/SEPTICEMIA	?ACUTE LEUKEMIA/SEPTIC SHOCK/SEPTICEMIA	YES	YES 1,4	YES	NO	6 HOURS	MEDICAL	0.12	POSITIVE	NORMAL STUDY	NORMAL	NORMAL	NON SURVIVOR
91	B/O PONNUMANI	58 DAYS	MCH	LOOSE STOOLS	FTT/ADD WITH SOME DEHYDRATION	FTT/ADD WITH SOME DEHYDRATION	YES	NO	NO	NO	7 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
92	MONISH	1 YEAR	MCH	CONVULSIONS	ACCIDENTAL CAMPHOR INGESTION/ENCEPHALOPATHY	ACCIDENTAL CAMPHOR INGESTION/CAMPHOR ENCEPHALOPATHY	NO	NO	NO	NO	3 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
93	YUVARANI	6 YEARS	FCH	VOMITING/LOOSE STOOLS	ACUTE KIDNEY INJURY	ACUTE KIDNEY INJURY	NO	NO	NO	NO	7 DAYS	MEDICAL	0.002	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
94	ANJALAI	10 YEARS	FCH	CONVULSIONS	STATUS EPILEPTICUS	STATUS EPILEPTICUS	NO	NO	NO	NO	4 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
95	GAYATHRI	3 YEARS	FCH	FEVER,BREATHLESSNESS	ACUTE MYOCARDITIS,CARDIOGENIC SHOCK	ACUTE MYOCARDITIS,REFRACTORY HYPOTENSIVE SHOCK	YES	YES 3	YES	NO	12 HOURS	MEDICAL	0.7	POSITIVE	LVEF 45%	NORMAL	CARDIOMEGALY	NONSURVIVOR
96	CHRIST DENNIS	6 MONTHS	MCH	FEVER/BREATHLESSNESS	BRONCHOPNEUMONIA	BRONCHOPNEUMONIA	NO	NO	NO	NA	5 DAYS	MEDICAL	0.002	NORMAL	NORMAL STUDY	NORMAL	BRONCHOPNEUMONIA	SURVIVOR
97	TRISHIKA	44 DAYS	FCH	PERINEAL GANGRENE/REFUSAL OF FEEDS	LOS/SEPTIC SHOCK/PERINEUM CELLULITIS/GANGRENE/DIVC	LOS/SEPTIC SHOCK/PERINEAL CELLULITIS/GANGRENE/DIVC	YES	YES1,4	YES	NO	5 HOURS	MEDICAL	0.35	POSITIVE	LVEF 45%	TACHYCARDIA, ST ELEVATION	DILATED BOWEL LOOPS	NON SURVIVOR
98	MAGILMATHI	1 YEAR	FCH	FEVER/BREATHLESSNESS	BRONCHOPNEUMONIA	BRONCHOPNEUMONIA	YES	YES 1	YES	YES	7 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	BRONCHOPNEUMONIA	SURVIVOR
99	MOHITH	10 MONTHS	MCH	FEVER/BREATHLESSNESS	BRONCHOPNEUMONIA	BRONCHIOPNEUMONIA	YES	YES 1	YES	YES	8 DAYS	MEDICAL	0.004	NORMAL	NORMAL STUDY	NORMAL	BRONCHOPNEUMONIA	SURVIVOR
100	SALMA	11 YEARS	FCH	FEVER	VIRAL FEVER WITH THROMBOCYTOPENIA	VIRAL FEVER WITH THROMBOCYTOPENIA	YES	NO	NO	NO	2 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
101	ANITHA	8 YEARS	FCH	FEVER	VIRAL FEVER WITH THROMBOCYTOPENIA	VIRAL FEVER WITH THROMBOCYTOPENIA	YES	NO	NO	NO	2 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
102	HARSHIKA	1 YEAR	FCH	FEVER,BREATHLESSNESS	WALRI/COMPENSATED SHOCK	WALRI/COMPENSATED SHOCK	YES	YES 1	NO	YES	2 DAYS	MEDICAL	0.002	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
103	RUCHITRA	3 YEAR	FCH	SCORPON STING	SCORPION ENVENOMATION	SCORPION ENVENOMATION	NO	NO	NO	NO	2 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
104	RAMAN	4 MONTHS	MCH	FEVER,BREATHLESSNESS	BRONCHIOLITIS	BRONCHIOLITIS	NO	NO	NO	NO	3 DAYS	MEDICAL	0.004	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
105	ILAVARASAN	12 YEARS	MCH	FEVER	VIRAL FEVER WITH THROMBOCYTOPENIA	VIRAL FEVER WITH THROMBOCYTOPENIA	YES	NO	NO	NO	4 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
106	MUTHUSELVAN	5 YEARS	MCH	ABDOMINAL PAIN/FEVER	APPENDICEAL PERFORATION/PYOPERITONITIS/ASPIRATION PNEUMONIA	APPENDICEAL PERFORATION/PYOPERITONITIS/ASPIRATION PNEUMONIA/LAPAROSCOPY DONE	YES	YES1,3	YES	YES	9 DAYS	SURGICAL/MEDICAL	0.002	NORMAL	NORMAL STUDY	NORMAL	PNEUMOMEDIASTINUM	SURVIVOR
107	SUBHASH	3 YEARS 6 MONTHS	MCH	FEVER/BREATHLESSNESS	MYOCARDITIS,CARDIOGENIC SHOCK/CONGESTIVE CARDIAC FAILURE/SEVERE MR	MYOCARDITIS/CCF/CARDIOGENIC SHOCK/SEVERE MR	YES	YES 3	YES	NO	1 DAY	MEDICAL	0.88	POSITIVE	DILATED CARDIOMYOPATHY	ST ELEVATION	DILATED CARDIOMYOPATHY	NONSURVIVOR

S. NO.	NAME	AGE	SEX	COMPLAINTS	PROVISIONAL DIAGNOSIS	FINAL DIAGNOSIS	VOLUME RESUSCITATION	IONOTROPIC SUPPORT	VENTI LATION	SHOCK CORRECTED/NOT	DURATION OF PICU STAY	TREATMENT-MEDICAL / SURGICAL	SERUM TROPONIN T(ECLIA)	RESULTS	ECHO CARDIOGRAM	12 LEAD ECG	CHEST XRAY	OUTCOME-SURVIVOR / NON-SURVIVOR
108	SOMNATH	8 YEARS	MCH	FEVER	VIRAL FEVER WITH THROMBOCYTOPENIA	VIRAL FEVER WITH THROMBOCYTOPENIA	YES	NO	NO	NO	4 DAYS	MEDICAL	0.002	NORMAL	NORMAL STUDY	NORMAL	RIGHT SIDED PLEURAL EFFUSION	SURVIVOR
109	SAARULATHA	11 YEARS	FCH	SNAKEBITE	SNAKEBITE	SNAKE BITE ENVENOMATION	NO	NO	YES	NA	5 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
110	ZOYA FATHIMA	2 MONTHS	FCH	FEVER,BREATHLESSNESS	BRONCHOPNEUMONIA	BRONCHOPNEUMONIA	NO	NO	NO	NA	3 DAYS	MEDICAL	0.004	NORMAL	NORMAL STUDY	NORMAL	BRONCHOPNEUMONIA	SURVIVOR
111	RAMYA	7 YEARS	FCH	FEVER	FEVER WITH THROMBOCYTOPENIA	FEVER WITH THROMBOCYTOPENIA	YES	NO	NO	NA	4 DAYS	MEDICAL	0.001	NORMAL	NORMAL STUDY	NORMAL	NORMAL	SURVIVOR
112	SUMAIYA BEGUM	2 MONTHS	FCH	FEVER,JAUNDICE	SEPTIC SHOCK/BILIARY ATRESIA INDUCED LIVER CIRRHOSIS	SEPTIC SHOCK/BILIARY ATRESIA INDUCED LIVER CIRRHOSIS	YES	YES 1,4	YES	YES	12 DAYS	SURGICAL	0.022	NORMAL	NORMAL STUDY	NORMAL	NORMAL	NON SURVIVOR

INSTITUTIONAL ETHICAL COMMITTEE, STANLEY MEDICAL COLLEGE, CHENNAI-1

Title of the Work : Assessment of Myocardial status in critically Ill Children admitted in PICU, Paediatric Intensive Care Unit, Stanley Medical College & Hospital.

Principal Investigator : Dr. V Sharmila

Designation : Pg, MD (Paediatrics)

Department : Department of Paediatrics
Government Stanley Medical College,
Chennai-01

The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 21.04.2017 at the Council Hall, Stanley Medical College, Chennai-1 at 2PM

The members of the Committee, the secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal investigator and their team are directed to adhere to the guidelines given below:

1. You should inform the IEC in case of changes in study procedure, site investigator investigation or guide or any other changes.
2. You should not deviate from the area of the work for which you applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reaction.
4. You should abide to the rules and regulation of the institution(s).
5. You should complete the work within the specified period and if any extension of time is required, you should apply for permission again and do the work.
6. You should submit the summary of the work to the ethical committee on completion of the work.

Member Secratory, 14/6/19
IEC, SMC, CHENNAI

MEMBER SECRETARY
ETHICAL COMMITTEE,
STANLEY MEDICAL COLLEGE
CHENNAI-600 001.

URKUND

Urkund Analysis Result

Analysed Document:	ASSESSMENT OF MYOCARDIAL STATUS IN CRITICALLY ILL CHILDREN IN PICU - A PROSPECTIVE OBSERVATIONAL STUDY.docx (D31575103)
Submitted:	10/23/2017 12:19:00 PM
Submitted By:	dr.v.sharmila@gmail.com
Significance:	0 %

Sources included in the report:

Instances where selected sources appear:

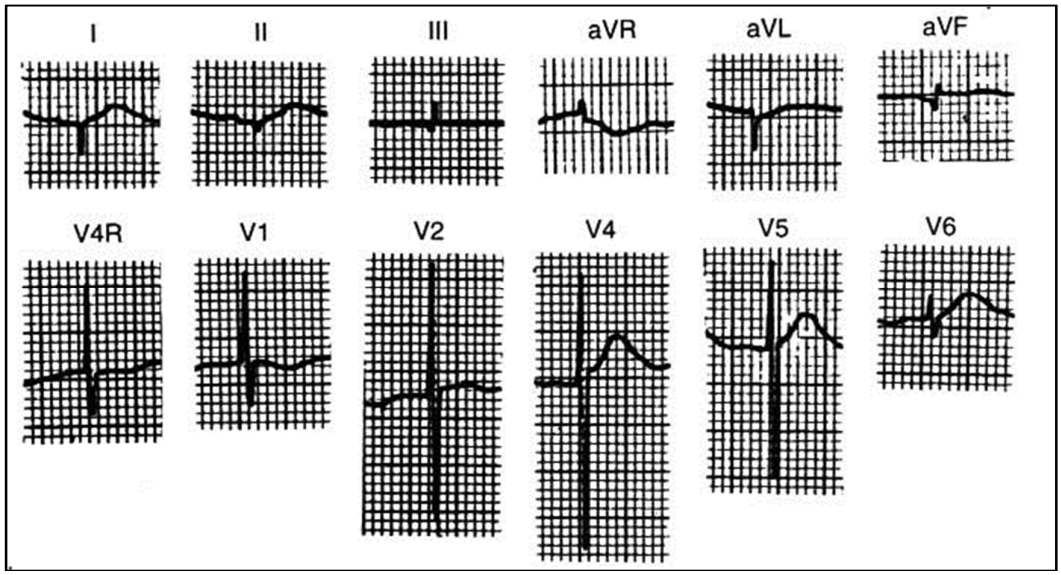
0

CERTIFICATE –II

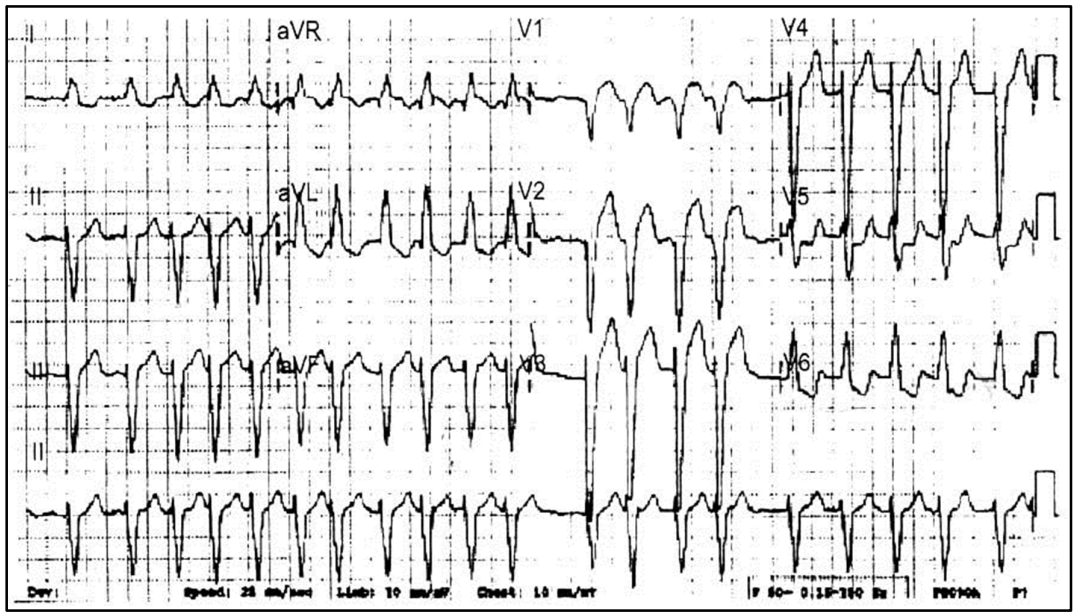
This is to certify that this dissertation work titled **"ASSESSMENT OF MYOCARDIAL STATUS IN CRITICALLY ILL CHILDREN IN PICU - A PROSPECTIVE OBSERVATIONAL STUDY"** of the candidate **DR. SHARMILA.V,** with registration Number **201617051** for the award of **M.D. PAEDIATRICS** in the branch of **VII**. I personally verified the urkund.com website for the purpose of plagiarism check. I found that the uploaded thesis file contains from introduction to conclusion pages and result shows **0 percentage** of plagiarism in the dissertation.

Guide & Supervisor sign with Seal

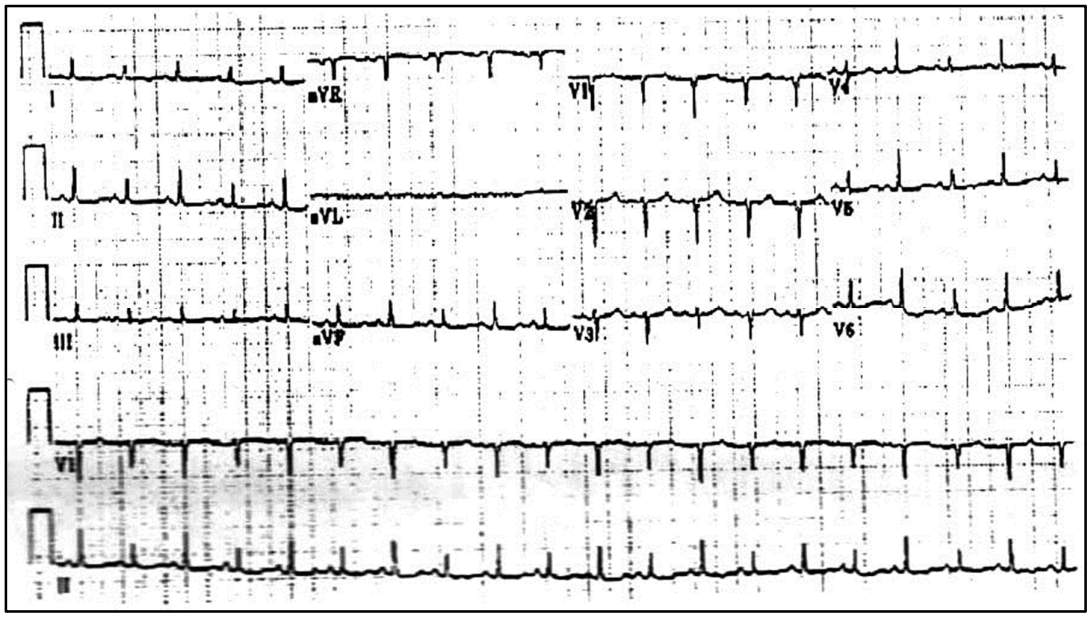
ABNORMAL ECG FINDINGS



4 Months old baby with congenital hypothyroidism
low QRS voltages in limb leads

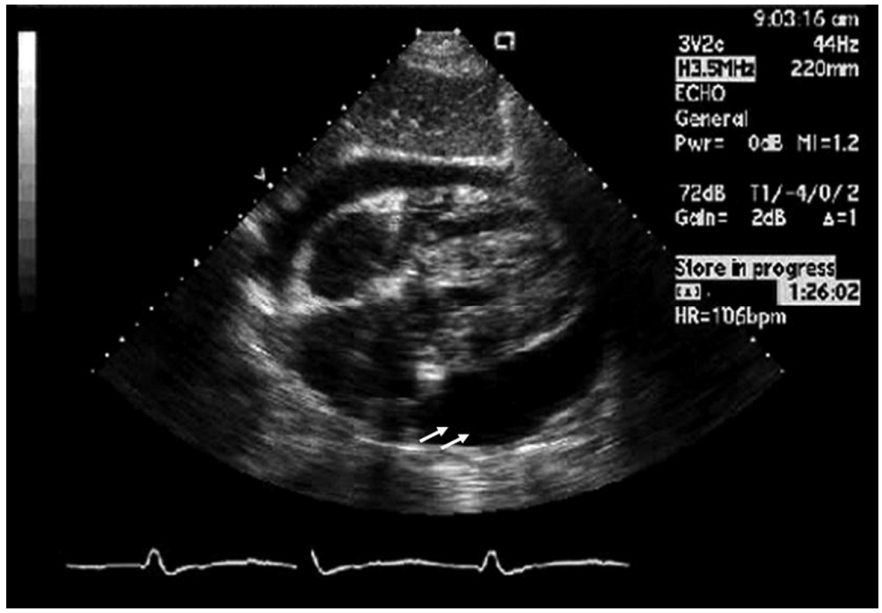


Dilated cardiomyopathy in 3 year old male child. ECG showing conduction delay due to cardiodilatation. Low QRS complexes in limb leads. Discrepancy of QRS voltages with signs of hypertrophy in V4-6 and relatively low voltages in the limb leads.

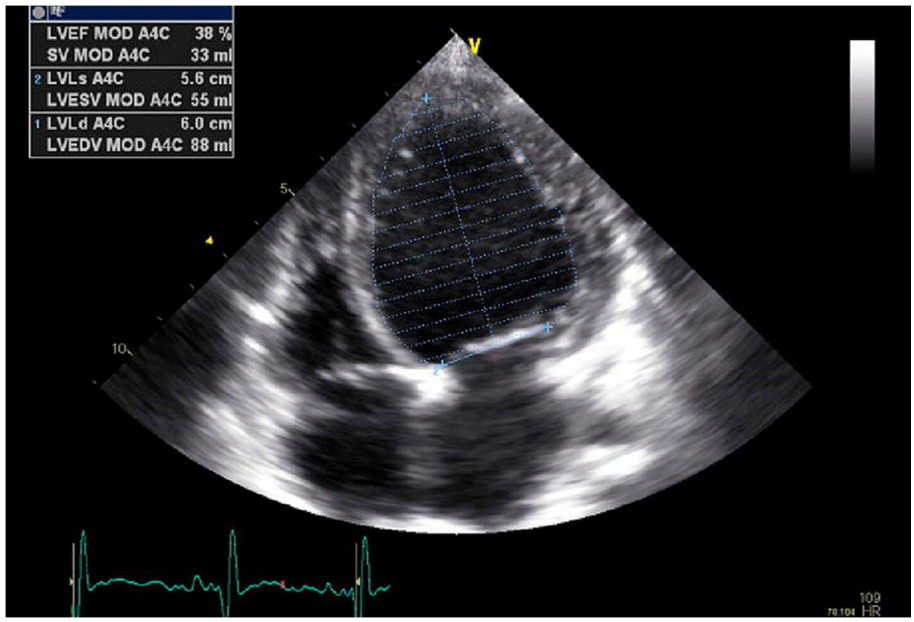


Pericardial effusion in a 4 months old boy with low voltage, tachycardia and electrical alternans.

ABNORMAL ECHO FINDINGS



Pericardial effusion in a 4 months old baby with congenital hypothyroidism



Dilated cardiomyopathy and low LVEF (30%) in a 3 year old male child with viral myocarditis and cardiogenic shock